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HEREDITARY BLINDNESS AND ITS PREVENTION.*

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About a year ago, my attention was called to the family history of an inmate of the Missouri School for the Blind, which showed the presence of cataract in all the members of the family for at least five generations. The first member of whom there was a record, was—

— W., male, blind. He had two sons, both of whom were blind. One of them had a son — M. F. W. The other had three children. All four of the children were blind, and M. F. W. is known to have had cataract. It is a fair presumption that the others, their fathers and their grandfather also had cataract. M. F. W. had four children, who constitute the *IV generation*. They are—

(1) M. W., female, congenital cataract; married — E.; they had one child.

(2) S. R. W., male, cataract at age 3 years; no children.

(3) W. H. W., male, cataract at age 2 years; no children.

(4) F. M. W., male, congenital cataract; married I. P., blind, but no cataract. They had one child.

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*Read in abstract at the thirteenth annual meeting of the American Academy of Ophthalmology and Oto-Laryngology, Cleveland, Ohio, August 28, 1908.

V generation.

This consisted of G. E., son of M. W., and L. W., daughter of F. M. W. Both had congenital cataract.

The family came originally from North Carolina, and in the list of pupils of the school for the blind of that state are to be found two of the same name. The degree of relationship, if it exists, is not known.

The question was asked, whether or not such a case constituted grounds for preventing blind persons from marrying, to which, of course, only one answer could be given, viz., that it was necessary to determine the exact role which heredity plays in blindness, before such a radical step could be taken. It is the fruits of investigations along this line which are here presented.

The problem to be solved naturally divided itself into two questions; first, is there such a thing as hereditary blindness; and second, what is the best method of combating it?

In as much as blindness, *per se,* is usually so formidable for sociologic rather than pathologic reasons, the term in this paper will be used to designate those cases where "there is a state of permanent diminution of vision sufficient to seriously impair the patient's chance to earn a livelihood." It does not include those cases where by the use of proper glasses or proper medicinal treatment the vision is restored to practically normal, but does include those cases where an operation is necessary before the patient has a good working vision. The former class is excluded, because the use of glasses is as much a recognized necessity to-day as the use of clothing, and because diseases amenable to treatment are only temporary in their bad effects. Where an operation is required, however, be the surgeon as skilful as he may, there is always a certain element of danger either to the eye, or to the life of the patient if a general anesthetic is employed, which makes the condition a much more formidable one.

With this introductory definition, it will be possibe to take up the question—

IS THERE SUCH A THING AS HEREDITARY BLINDNESS?

Upon purely theoretic grounds, it cannot be denied that hereditary blindness is at least a possibility; for the eye, no less than other organs of the body, must be regarded as the resultant of long ages of evolutionary progress.

The eye of the lower animals differs in many respects from that of man, but wherever found, it is an organ specially adapted to the visual necessities of its possessor. It has come to its present state through a process of natural selection, those variations which tended to make the eye more serviceable to the species being preserved and inherited by succeeding generations, while those which made the eye of less value were lost in the early death of their unfortunate possessors. But, on the other hand, it is possible to conceive of a condition of life where acute vision would be unnecessary, not to say harmful. Under such circumstances, the possessor of a non-functionating eye could easily survive and bequeath to its descendants its own special variation. If they in turn survived, the same process would continue until that type of eye became the type of the species. This has actually happened in the case of the blind fish of certain caves of Indiana and Kentucky. In the state of total darkness which there obtains, an eye of the anthropoid type, for example, would be absolutely superfluous, and we find that the eyes of these fish are in a very rudimentary stage. Whether they are considered as eyes in a state of arrested development or of retrogressive metamorphosis, they are undoubtedly the result of many generations of inherited adaptation to environment. If then, in a state of nature, where the law of the survival of the fittest finds its widest application, there are forms of life proving the actuality of the inheritance of abnormal eyes, can there be any doubt that the same will obtain in a state of Society, or Civilization, if you prefer, where the element of altruism enters? If the blind patient is the child of rich parents, he is the object of all the care that wealth guided by love can bestow. If his parents are poor, the doors of our eleemosynary institutions are opened for him. The end result is the same. An attempt is made to bring the child to adult life, in spite of his ocular imperfection. If he marries a person with normal eyes, who shall say that the tainted state of the one will not have as great an influence on the eyes of their children as the normal state of the other? If both parents are blind, especially if the nature of the blindness is the same in both cases, is it not reasonable to suppose that the children will be affected to a great degree by the combined ocular stigmata?

I have been at pains to make this clear, because some physicians have denied the possibility of hereditary blindness. Not only, however, is it theoretically possible, but it is also theoretically probable.

But after all, theoretic considerations are at best poor substitutes for actual facts, and are valuable only when confirmed by statistics. Of the latter there are two sources; first, the unrecorded experiences of the practitioners of to-day; and second, a review of the literature. To ascertain as far as possible the number of cases of unreported hereditary blindness, the following letter was sent to 1750 oculists and superintendents of institutions for the blind in America and Europe:

....

....

Dear Sir: There has recently come to my attention a case of hereditary blindness, where congenital cataract occurred in the offspring of parents both of whom were blind. This deplorable state of affairs, in addition to arousing pity for the unfortunate fruits of such marriages, brings up the question of the advisability of discouraging such unions, either by law or precept. It is, however, first necessary to determine whether such a case as I have quoted is the rule or the exception, and this can be done only by collecting statistics from the records of physicians and of institutions for the care of the blind. To this end, the Scotoic Aid Society of Missouri,, a society for promoting the economic welfare of the blind, requests the courtesy of answers to the questions indicated in the attached circular. Of course, all names of patients will be omitted in the published report, a copy of which I shall be glad to send you if desired. The names are wanted only so as to avoid duplication. It is requested that the answers conform as much as possible to the scheme outlined in order to lighten the task of classifying the statistics.

Thanking you in advance, I remain,

Yours very truly,

Accompanying this circular letter was the following blank for the recording of data:

1. Name of physician or institution.

2. Do you encourage, advise, permit or discourage the intermarriage of two blind* persons?
3. Why?
4. Do you encourage, advise, permit or discourage the marriage of a blind* person with one of normal sight?
5. Why?
6. Have you knowledge through records or hearsay of such marriages as in questions 2 and 4 above? If so please detail in the following table:

Following this was a table for the recording of data concerning the family history, as follows:

Name (Woman before marriage).
Record or hearsay.
Related to other cases.
Ocular disease.
Cause (if acquired).
Hereditary.
Duration patient's disease.
Result treatment.
Condition of eyes of:
  Parents.
  Grandparents.
  Great-grandparents.
  Brothers and sisters. Normal. Diseased.
  Uncles and aunts.
  Cousins.
  Nephews and nieces.
  Children. Normal. Diseased.
  Other descendants. Normal. Diseased.
Remarks.

In Appendix A will be found some of the replies received. To summarize here, answers were received to 152 letters; the remainder were either missent, or the recipients did not regard the matter as of sufficient importance to merit a reply. The answers fall conveniently into the following divisions: Fifteen approve of the marriage of two blind persons, for sentimental or economic reasons; thirty-one approve of the marriage of a blind person with one of normal sight, for sentimental or economic reasons; twenty-six discourage the marriage of two blind persons, for sentimental or economic reasons, and ten discourage the marriage of a blind with a seeing person for the same reasons; fifty-eight discourage the marriage of two blind persons where the disease is congenital or hereditary, on account of danger to the offspring, and forty-two discourage the marriage of a blind with a seeing person for the same reason; sixty-five letters were received acknowledging receipt of the circular letter of inquiry, but for various reasons no opinion was given. In the remaining eighty-seven, sometimes only one question was answered, sometimes both, with the various reasons for the answers given above.

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*Blind includes great loss of sight from any cause.

The result of the inquiry would tend to show that the majority of those who come into professional relationship with the blind are either unacquainted with, or are indifferent to the dangers of hereditary blindness. Of the answers received, however, the great majority (84 to 15) are opposed to the marriage of two blind persons. A smaller number, but still a majority (52 to 31), are opposed to the marriage of a blind with a seeing person. The reasons advanced by those who favor the latter marriage are that the house is run better and the children better taken care of when at least one of the parents has normal sight. This is undoubtedly true, although the argument is a strictly economic one. But the additional reason is brought forward, frequently, that there is much less danger to the offspring than when both parents are blind. This argument is at first sight a valid one, but is really fallacious. In the first place, the percentage of blind persons with hereditary disease, as compared to those with other forms, is very small, probably not more than 10 per cent. So, no more than 1/10 of all blind persons are capable of transmitting their affection to their children. Another fact noted by several authors is that children affected with hereditary blindness frequently die young. So that the chance of two individuals affected with any form of hereditary blindness marrying is small, and the chance of these two having the same form of hereditary blindness, so that the cumulative action of two tainted lines of ancestry would have an influence, is very small indeed. As a result, most of the cases of hereditary blindness reported have been those where only one parent was blind. The argument, therefore, should not be that where one parent has normal sight there is only one-half the chance for hereditary transmission, but should rather be, that, in as much as the danger is so great where only one parent is blind, it must be still greater where both are affected. As a matter of fact, the percentage of affected children in both cases is about the same, though the small number of reported cases of double parental blindness makes the statistics of that form less reliable.

Both forms of marriages should be weighed in the same balance, and the victim of hereditary blindness must either be allowed to marry whom he desires, or must be prevented from marrying at all. As to the blind, who do not suffer from hereditary blindness, their fate must be settled upon economic and sociologic grounds, the discussion of which is beyond the province of this paper.

If there seems to be a lack of interest or of cases in the present generation of oculists, there is certainly no paucity of reported cases. It has been possible to collect 496 references, which are given in an abbreviated form in Appendix B. Where possible, they have been grouped under their respective heads. Where this was impossible, they have been included under the head of General Diseases. This includes cases of amaurosis from preophthalmoscopic times, cases of inherited ocular disease whose number is too small to possess statistical value, those where one form of blindness was succeeded by another, etc. From a study of the literature, as well as the cases reported in the replies received, it can be stated that there are twelve forms of blindness distinctly characterized by the property of hereditary transmission; viz., albinism, aniridia and coloboma iridis, anophthalmus and microphthalmus, atrophia nervi optici, cataract, ectopia lentis, family degeneration of the cornea, glaucoma, megalophthalmus, nystagmus, ophthalmoplegia externa and strabismus, and retinitis pigmentosa. In addition to these may be mentioned color-blindness and refractive errors. But the former has an economic aspect only in relation to certain occupations, and the latter are usually capable of being corrected by glasses. So, while they may be very inconvenient conditions, they are not of as vital importance as the others named, and the few cases noted are classed under the head of General Diseases. The disease called amaurotic family idiocy has an unique status. For, while the condition is undoubtedly hereditary, the patients, as far as I know, have invariably died in infancy, thus cutting short the line of taint. Consequently, it has not been considered in this paper.

Outside of these, practically the entire range of ocular disease is free from hereditary influences. From the standpoint of a physician, there can be no reason for restricting patients suffering from these non-hereditary diseases from marrying, especially if one of the parents can see enough to take care of the house and the children. The question then becomes a purely economic one, with which this paper has nothing to do.

Hereditary transmission of disease may take place in one of two ways; first, the same disease may be present in the one who inherits and the one who transmits it; second, the diseases are different in the two persons, but bear a relationship to one another, which may be called correlation. For instance, one child may have retinitis pigmentosa, another may be a deaf-mute, and a third may be an idiot, etc. This association of diseases occurs too often to allow it to be called coincidence.

The first form of heredity is called similar, and the second dissimilar heredity. In this paper, only similar heredity has been dealt with, as it was felt that investigation of dissimilar heredity would complicate a none too clear subject. Similar heredity, and for that matter dissimilar also, occurs in three forms, viz., direct, indirect, and collateral.

I. Direct Heredity. In this form, the same disease is found in parent and child. Other members of the parent's family may be affected also.

II. Indirect Heredity. In this form, one or more children suffer from a disease from which the parents are free, but which is present in one or more ancestors, uncle or aunt. The disease is said to be latent in the parent, who transmits only the tendency.

III. Collateral Heredity. In this form, two or more children suffer from a disease which is not found in either of the parents or any of their relatives, with the possible exception of cousins of the same generation. A more exact family history frequently reveals the fact that one or more ancestors suffered from the disease, whereupon the form changes from collateral to indirect or direct, usually the former. Collateral heredity is frequently found in children of consanguineous parents, which is probably due to a cumulative action of two lines of tainted ancestry, either of which by itself was too weak to affect the parent.

It should be remembered that if we trace back the hereditary taint, even if it be through several generations, we will ultimately reach an ancestor where the disease originated *de novo*, either from accident, disease, congenital malformation, maternal impression, or whatever the cause may be. Therefore, it seems to me of minor importance to determine what proportion of patients have had blind ancestors, or in other words what proportion of blind persons suffer from hereditary disease. If we have a patient with microphthalmus, it is of little benefit for us to know, as Magnus says that 7.41 per cent of all of his cases of congenital amaurosis suffered from this disease. But the other phase of the question, viz., how many of a blind parent's children will become blind as a direct result of their parent's blindness, that is indeed a vital point.

No man should be held responsible for the condition of his ancestor's eyes, but if it can be shown that in the past a large percentage of children have been affected with the same ocular lesion as their parent, then two conclusions seem to me to be inevitable; first, that the past is the index of the future, and that, therefore, practically the same percentage will continue to obtain. This is so axiomatic that one of the most exact of modern businesses is based on it, viz., that of life insurance, which estimates the number of deaths in a given number of indivduals at a certain age on the basis of the number of deaths that have occurred at that age in the same number of people. It does not say who will die, it merely foretells the number. In the same way, the fact that a parent with hereditary blindness has a number of normal children is no absolute proof against the heredity of that disease. Somewhere, there is another parent with enough blind children to restore the balance of the percentage.

The second conclusion is that inasmuch as childhood is dependent on parentage, it is our duty as oculists, alive to the responsibility of eradicating eye disease as far as possible, to recommend, first, that no person suffering from these forms of eye disease which have been named be allowed to marry; second, that persons coming from families tainted with diseases showing a high percentage of indirect heredity, though they themselves may have normal eyes, should be advised not to marry; third, that parents having two children suffering from a disease whose collateral percentage is high, should be warned of the danger to subsequent children, with the advice that they check the disease at that point These recommendations rest on the assumption that the percentage of affected children is high, at least 33 1/3 per cent, or one in every three children. On the other hand, if blind parents usually have normal children, or at the most a very small percentage of affected ones, we may well hesitate to interfere with their right to marry. The whole question, therefore, hinges on the percentage of blind children of blind parents.

In arriving at such a percentage, it is necessary to collect a large number of cases of the different forms of hereditary blindness, mentioned above Fortunately, the literature and the replies to the circular letters furnish a sufficient number of cases to enable us to arrive at a judgment. In estimating the number of families so affected, the following method was used: Every blind parentage and the blind or normal children therefrom constituted a family. If there were, for example, three generations, that was considered equal to two families; that is, that of the grandfather and his child, and that of this child and his children. If there was more than one child in the second generation, each one with his children constituted a separate family. The attempt was made in each case to find out the number of normal children as well as the blind ones. Where none were mentioned, it was assumed that the reported children were the only ones. This is perhaps erroneous, but it was the only thing that could be done, and I do not believe that the number of unreported and normal children would alter the results materially. Where a child was reported normal, but far below the age at which the disease appeared in the other children, it was usually regarded as non-existent. Where there was any doubt, the normal children were always given the benefit of it. Where the normal children themselves had normal children, such families were not used in the calculation. For the purpose of the investigation is to estimate the number of blind children of blind parentage, and to include the normal children of normal parents, even though they belong to the same tainted family tree, would introduce an element of error into the calculation. This must be clearly understood, otherwise any attempt to verify the percentages arrived at will result in hopeless confusion.

Indirect heredity from grandparent to grandchild was, in addition, equal to one family of direct heredity, where the parent of the grandchild was the normal child of the affected grandparent. It might be questioned whether such a parent could really be normal, with a latent taint, but at least the advocates of the marriage of the blind cannot object to this method of calculation. Indirect heredity from uncle or aunt to nephew or niece bears no relation to the parents of the children as far as direct heredity is concerned, merely showing a latent taint. One affected child in a family of one or more children of normal parents, where some uncle, aunt or ancestor was affected, was considered proof of indirect heredity.

Collateral heredity is found when at least two children of one generation are affected. If it were possible to know the condition of all the children of one generation, that is to say first cousins as well as brothers and sisters, the statistics would be more ample, and perhaps truer As it is, it was necessary to confine the calculation of collateral heredity to children of the same parents, where two at least were affected.

If only one child out of an absolutely normal family was affected, it was evidently a case of *origo de novo*. Consequently, there could be neither indirect nor collateral heredity, and direct heredity would be present only in case the affected child later had affected or normal children.

In Appendices A and B, each reference is followed by a statement of its direct, indirect and collateral heredity, showing the number of families, the sex of the parent affected, the total number of children and the number of affected and unaffected children. The following is a summary of these:

I. Albinism. There have been reported in the literature 5 families of albinism showing direct heredity or lack thereof. The father was affected twice and the mother three times; there were 17 children, of whom 2 were affected and 15 not, a percentage of affected children of only 12 per cent. There were no cases of indirect heredity. Collateral heredity was found in 8 families, with a total of 43 children, of whom 21 were affected—48 per cent.

From this it appears that the danger from direct and indirect heredity is very small, while that from collateral heredity is, on the contrary, rather great. A large number of cases is required, however, before a positive and exact statement can be made of the role played by heredity in albinism.

II. Aniridia and Coloboma Iridis. Fifty-eight families showing direct heredity have been reported. The father was affected 29 times and the mother 29 times. There were 152 children, of whom 113 were affected—74 per cent. To these must be added the case reported by Dr. Pflugk, making 59 families, 29 fathers and 30 mothers affected; 156 children; 116 affected—74 per cent. Collateral heredity was present in 9 families, containing 31 children, of whom 23 were affected—74.2 per cent. Four families showed indirect heredity in 8 out of 12 children—66 2/3 per cent.

These percentages clearly show that heredity is a very vital factor in the ocular states of children born into a family, any member of which shows aniridia or coloboma iridis.

III. Anophthalmus and Microphthalmus. In twenty-three families, 9 fathers and 14 mothers showed direct transmission; 37 of the 52 children were affected—70 per cent. To these must be added the cases reported by Drs. Pflugk and Komoto, making 26 families, 11 fathers and 15 mothers affected; 57 children; 40 affected—70 per cent. Indirect heredity was found in only 2 families, all three children being affected—100 per cent. To these must be added the case reported by Dr. Pflugk, making 3 families, 4 children, all affected—100 per cent. Eighteen families showed collateral heredity, 41 of the 54 children being affected—76 per cent. To these must be added the case reported by Dr. Komoto, making 19 families; 56 children; 43 affected—77 per cent.

This conditon shows an extremely high percentage of affected children. Of course, the indirect heredity is based on too few cases to possess a more than relative value, but in conjunction with the other percentages, the danger of marriage into a family, any member of which has anophthalmus or microphthalmus is shown to be very great.

IV. Atrophia Nervi Optici. Forty-six families have been reported showing direct heredity, in which there were 28 affected fathers and 18 affected mothers. Of the 120 children, 56—46 2/3 per cent—were affected. Indirect heredity was present in 43 families, where 93 of the 155 children were affected—60 per cent. Collateral heredity was found in 59 families, with 221 children, of whom 154—69.6 per cent—were affected. To these must be added the cases reported by Drs. Grauell and Merrill, making 61 families; 231 children; 163 affected—70 per cent.

Although all three forms of heredity are very important factors in this disease, collateral heredity seems the most dangerous, indirect less so, and direct least of all The greater number of families of collateral heredity, but not its high percentage, is probably due to the fact that many cases of direct and indirect heredity started as collateral. A point of interest is the tendency towards indirect heredity from affected uncle through unaffected mother.

V. Cataract. Direct heredity of cataract was present in 286 families, the father being affected 135 times and the mother 144 times, unknown 7 times. Of the 965 children, 554 were affected—57 per cent. To these must be added the cases reported by Drs. Carroll and Trimble, Carter, Gifford, Green, Pflugk, Todd, Van Note, Weeks, Wood, and the author, making in all 304 families, 145 fathers and 152 mothers and 7 unknown affected; 1,012 children; 589 affected—58 per cent. Both parents were affected once; of their 8 children, 2 were affected—25 per cent. To these must be added the cases reported by Drs. Lewis and Minor, making 3 families of both parents affected; 15 children; 9 affected—60 per cent. Indirect heredity was found in 28 families, where 44 of the 106 children were affected—41 per cent. To these must be added the case reported by Dr. Pflugk, making 29 families, 107 children; 45 affected—42 per cent. Sixty-four families showed collateral heredity, 182 of the 298 children being affected—61 per cent. To these must be added the cases reported by Drs. Bruns, Carrol and Trimble, Carter, and Komoto, making 68 families; 312 children; 193 affected—61.8 per cent.

In cataract, also, all three forms of heredity show a high percentage, although the indirect form is considerably less than the other two. As to the cases where both parents were affected, they are too few to base any judgment, except that the danger of the children when only one parent is affected is about the same as when both are affected.

VI. Ectopia Lentis. This condition was present in 18 fathers and 24 mothers, making 42 families. Of the 150 children, 106 were affected—70 per cent. To these must be added the case reported by Dr. Charles, making 43 families; 19 fathers and 24 mothers affected; 155 children; 109 affected—70 per cent. There were only 3 families showing indirect heredity; 6 of the 12 children were affected—50 per cent. Eighteen families showed collateral heredity; 40 of the 45 children were affected—88.8 per cent.

It is unnecessary to comment upon these figures.

VII. Family Degeneration of the Cornea. Although it has been claimed that corneal affections are not hereditary, 18 cases of family degeneration of the cornea have been reported. The father was affected 10 times and the mother 8 times; 26 of the 62 children were affected—42 per cent. There was one family of indirect heredity with 2 children, both affected—100 per cent. There were 13 families of collateral heredity, with 50 children, of whom 34 were affected—68 per cent.

VIII. Glaucoma. Forty-three families of direct heredity have been reported, the father being affected 22 and the mother 21 times. Seventy of the 129 children were affected—54 per cent. To these must be added the case reported by Dr. Singleton, making 44 families; 23 fathers and 21 mothers affected; 131 children; 72 affected—55 per cent. There was only one case of indirect heredity, 4 of the 10 children being affected—40 per cent. Collateral heredity was present in 13 families, 33 of the 53 children being affected—62 per cent.

Although glaucoma was early recognized as hereditary, the percentage of affected children is not as high as in some of the diseases where this factor has not been emphasized.

IX. Megalophthalmus. Only one family showed direct heredity. The mother and her 1 child were affected—100 per cent. No cases of indirect heredity. Collateral heredity was found in 7 families, 20 of the 27 children being affected—74 per cent.

These high percentages are based on too few cases to be exact.

X. *Nystagmus.* Nystagmus, either alone or accompanying other diseases, was found directly inherited in 18 families, the father being affected 8 times, and the mother 10 times, 26 of the 56 children being affected—46 per cent. Indirect heredity was present in 3 families, all of the 11 children being affected—100 per cent. Nine families showed collateral heredity, 29 of the 40 children being affected—70 per cent.

XI. *Ophthalmoplegia and Ptosis.* Under this head cases of strabismus are included. There have been 31 families reported showing direct heredity, 24 fathers and 7 mothers being affected. Seventy-four of the 112 children were affected—66 per cent. To these must be added the case reported by the author, making 32 families; 24 fathers and 8 mothers affected; 121 children; 77 affected—63.6 per cent. Both parents were affected in one case, and of their 6 children, 3 were affected—50 per cent. One family showed 100 per cent of indirect heredity. the only child being affected. Four families showed collateral heredity, 11 of the 15 children being affected—73 1/3 per cent. To these must be added the case reported by the author, making 5 families; 17 children; 13 affected—76 per cent.

XII. *Retinitis Pigmentosa.* There were 118 families of retinitis pigmentosa reported as showing direct heredity. The father was affected 56 and the mother 62 times. Exactly one-half of the 382 children were affected—50 per cent. To these must be added the cases reported by Drs. Alleman and Ewing, making 126 families; 61 fathers and 65 mothers affected; 405 children; 205 affected—50.6 per cent. Two cases are reported where both parents were affected, 5 of their 10 children being also affected—50 per cent. Twenty-five families of indirect heredity had 52 out of 71 children affected—73 per cent. In 132 families containing 535 children. 343 showed collateral heredity—64 per cent. To these must be added the cases reported by Drs. Ryerson and Wood, making 133 families; 541 children; 349 affected—64.5 per cent.

Here, again, the fact of both parents being affected has not raised the percentage of direct heredity. The greater danger of collateral heredity is shown by the larger number of cases and the higher percentage.

XIII. General Diseases. It would be impossible to discuss thoroughly, in a few words, the information grouped under the head of general diseases. The cases range from the hereditary influences of acquired lesions of the eye, to that of sarcomata; from the amaurosis of preophthalmoscopic times to color-blindness. There are numerous cases of dissimilar heredity, and these do not include the cases of deaf-mutism, idiocy, etc., which might have been included. Though they possess no statistical value for the purposes of this paper, they are strongly confirmatory of the danger to children from hereditary blindness. Under this head come properly the numerous cases reported in the letters from the different institutions for the blind, showing strong hereditary tendencies, though, unfortunately for the most part, lacking statistical value.

General Remarks.

If the results of the investigation are assembled in tabular form, several interesting facts become at once visible:

DISEASES.	Direct Heredity. Both parents affected.					Direct Heredity. One parent affected.							Indirect Heredity.					Collateral Heredity.				
	Families	Total children	Affected children	Normal children	% affected children	Families	Affected fathers	Affected mothers	Total children	Affected children	Nor'l children.	% affected children	Families	Total children	Affected children	Normal children	% affected children	Families	Total children	Affected children	Normal children	% affected children ....
I Albinism	..	....	....	....	....	5	2	3	17	2	15	12.	0	0	0	0	0.	8	43	21	22	48.
II Aniridia and Coloboma iridis	..	....	....	....	....	59	29	30	156	116	40	74.	4	12	8	4	66.6	9	31	23	8	74.2
III Anophthalmus and Microphthalmus	..	....	....	....	....	26	11	15	57	40	17	70.	3	4	4	0	100.	19	56	43	13	77.
IV Atrophia nervi optici..............	..	....	....	....	....	46	28	18	120	56	64	46.6	43	155	93	62	60.	61	231	163	68	70.
V Cataract	3	15	9	6	60.	304	145	152	1,012	589	423	58.	29	107	45	62	42.	68	312	193	119	61.8
						unknown 7																
VI Ectopia lentis	..	....	....	....	....	43	19	24	155	109	46	70.	3	12	6	6	50.	18	45	40	5	88.8
VII Family Degeneration of the Cornea	..	....	....	....	....	18	10	8	62	26	36	42.	1	2	2	0	100.	13	50	34	16	68.
VIII Glaucoma	..	....	....	....	....	44	23	21	131	72	59	55.	1	10	4	6	40.	13	53	33	20	62.
IX Megalophthalmus	..	....	....	....	....	1	0	1	1	1	0	100.	0	0	0	0	0.	7	27	20	7	74.
X Nystagmus	..	....	....	....	....	18	8	10	56	26	30	46.	3	11	11	0	100.	9	40	29	11	70.
XI Ophthalmoplegia and Ptosis.......	1	6	3	3	50.	32	24	8	121	77	44	63.6	1	1	1	0	100.	5	17	13	4	76.
XII Retinitis pigmentosa	2	10	5	5	50.	126	61	65	405	205	200	50.6	25	71	52	19	73.	133	541	349	192	64.5
						unknown 7																
Tota's and average per centages....	6	31	17	14	54.8	722	360	355	2,293	1,319	974	57.5	113	385	226	159	58.7	363	1,446	961	485	66.4

(Unknown 7 belongs to cataract and should indicate that in 7 cases it was not known whether the father or the mother was affected.—Loeb.)

In the first place, the average percentage of affected children in all diseases taken together is 54.8 per cent when both parents are affected, and 57.4 per cent when only one is affected. This cannot be taken as proof that the latter is more dangerous than the former, as there are too few cases of the former for a hard and fast percentage. But it does show that there is as much reason to object to the marriage of one blind person as when both are blind.

The percentage of indirect heredity is somewhat higher than that of direct, while that of collateral is the highest of all. This shows, at the very least, the danger that a latent taint may at any time break forth and affect the children of apparently healthy parents, who come from affected families.

Although some diseases seem to manifest a partiality for transmission through the father, and others through the mother, the total number of those affected was 360 fathers and 355 mothers, 7 unknown, or almost exactly the same. When any disease shows a preponderance of affected parent of either sex, it is in my opinion merely due to the fact that more of that sex happened to marry and have children. On the other hand, it is undoubtedly true that most cases of indirect heredity of optic nerve atrophy occur through the mother.

Attemps to better the condition of mankind have almost always been met by the opposition of those to be benefited. Vaccination has its opponents even to-day. Every physician who has been in general practice knows how difficult it is to enforce the laws requiring the report of infectious diseases. Nowhere was this more strikingly shown than in the recent yellow fever epidemic in the South. We are at present passing through an anti-vivisection craze, though it is unnecessary to state how much vivisection and animal experimentation have done for mankind. And it is rather amusing to note the difference with which the physical betterment of the lower animals and of man is regarded. For the careful stockman will breed the best stock of cattle that he can obtain; the dog fancier will choose the hound or setter or pointer with the best pedigree; the horseman will select the colt of the horse that has clipped off a few seconds from the world's record, and so it goes. Only in the case of man, the belief seems to obtain that there is a grand dispensation of Nature, by virtue of which he may violate her laws with impunity. He may not steal the property of another, but he may steal from himself the time necessary for rest and recreation. He may not kill his fellowman, but he may drink himself to death if he so desires. Any attempt to bring about a better hygienic or physiologic condition is met with the cry of "interference with the rights of man."

If, therefore, the proposition to prevent people suffering with hereditary blindness from marrying is met by the same cry, it is no more than was to be expected. Only, it is a rather unfortunate argument, inasmuch as a review of history will show that regulation of marriage has always been a function of the church, in the past, and of the State in the present, and the tendency has been towards restriction rather than relaxation. From polygamy we have come to monogamy. From the Ptolemy Pharohs of Egypt, who married their sisters, we have come to the law forbidding relatives as near as first cousins from marrying. Every regulation has passed through three stages; first, active opposition; second, passive obedience; third, axiomatic acceptance, and the proposition to prevent the blind from marrying is at present passing through the first stage. The State undoubtedly has the right to enforce such a regulation if it is shown to be to its best interest, and surely it is to its best interest to prevent the birth of individuals handicapped from the start by the inheritance of ocular defect.

There is one more argument or rather plea which must be answered, viz., that the lives of these unfortunate men and women be not made still darker by depriving them of the joys and companionship of married life. Yes, but what of the children? What of their sufferings and sorrow? Will it make the darkness of their lives any brighter because their parents have been happy? If a man had 10 children and should blind 7 of them, what extenuation would the fact of his desire for happiness have? Yet that is exactly the risk that any man with anophthalmus takes when he marries, that 70 per cent of his children will also have anophthalmus or microphthalmus. Is his happiness a sufficient compensation for their misery? Have you more sympathy for the man, for his few moments of grief, than for their long years of sorrow? The normal child of normal parents has a hard enough time of it in this world. Do you think that the struggle of life will be any easier for the blind child of blind parents? Let us face the situation squarely; if the marriage of the blind is advocated, it must be done with the full knowledge of the danger to the offspring, which can be prevented only by an interference with the normal processes of Nature, which no physician will advocate.

It may be that in the course of time the advance of our science will bring us to a thorough understanding of the genetic principles of life, and thus provide a method of nullifying the adverse forces of heredity. When that time comes, all restrictions may be laid aside, but until then, it is the part of prudence and even of philanthropy to prevent the marriage of those affected with the forms of blindness enumerated above.

What Is the Best Method of Preventing Hereditary Blindness?

We have now come to the second question which was to be solved, viz., what is the best method of preventing hereditary blindness? As already indicated, it is by preventing the marriage of persons affected with these forms of blindness, and thus checking them in their incipiency. This will not cause these forms of blindness to disappear, for they will continue to originate *de novo,* but it will cut short the tainted line of heredity. As to the best method of carrying out this solution, the following recommendations are offered:

I. All those whose life-work brings them into relationship with the blind should be made acquainted with, if they are not already aware of, the dangers which are connected with the marriage of a blind person, whether to one of normal sight or to another blind person. As a corollary to this, I would suggest that this Society put itself on record in some formal manner as to its position upon this question.

II. The blind, themselves, should be warned of the danger to their children in case of marriage, and should be strongly advised to remain single.

III. A distinction must be made between hereditary and non-hereditary forms of blindness. In the former, the chances of the child inheriting the parent's disease is too great to allow any option. In the latter, social and economic considerations enter with which the present paper cannot concern itself.

IV. In addition to mere precept, legal assistance should be invoked to prevent blind people from marrying. This, in my opinion, could be most practically carried out by the license clerk inquiring if either of the parties had any disease of the eyes. In case of an affirmative answer, the certificate of a reputable oculist should be required, stating that the disease is non-inheritable. If a negative answer is returned, both parties should be required to write their names, as most of the sufferers from hereditary eye affections have lost their vision to such an extent as to make this difficult. If the clerk suspects from any reason that one or both of the parties are affected, he shall refuse the license until a proper certificate is obtained. This is analogous to the right of a clerk to refuse a license to those whom he believes to be under age, in spite of their positive declaration to the contrary. That there are objections to this method of solving the difficulty is not denied, but it seems the most practical.

V. This law is to apply only to those cases of blindness where heredity has been proved. With the exception of glaucoma and cataract, these diseases usually manifest themselves at or before the marrying age. In the two exceptions noted, unless they are anticipating or congenital, the marriage has been consummated before the disease apears in the parent. Consequently, the offsprings of such marriages may be totally ignorant at the time of their own danger and that of their children. It would be better for no descendant of a cataractous or glaucomatous ancestor to marry, but it will be found impossible to prevent those from marrying who do not show the taint at the time of marrying, because they will deny the presence of the disease in their ancestors.

VI. It would be inadvisable to pass a law compelling every person to have an oculist's certificate before being allowed to marry, although such a law would be the ideal condition. In the first place, it would work a great hardship in those localities where there is no competent oculist. In the second place, the ratio of blind persons of all kinds to those of normal sight is comparatively small, according to the Swiss census of 1895-96, as reported by Paly, being between 7 and 8 in every 10,000. The percentage of those who are blind from hereditary blindness is between 5 per cent. and 10 per cent. of the total number of blind persons, so that less than 1 in every 10,000 persons in any country would be affected by the law proposed. It would be impossible to enforce such a law upon 9,999 persons in order to compel its observance by the 1 person, and the discretionary power in the hands of the license clerk would serve for the present.

VII. Finally, there is the important duty of educating the general public in the dangers arising from hereditary blindness. They should be told that even though they may be normal themselves, if two of their children are blind, there is great danger to subsequent ones, and that large families in such cases should be avoided. Furthermore, they should be advised to prevent as far as possible the marriage of their children into families tainted with hereditary blindness. They should be warned that sisters of men suffering with hereditary optic nerve atrophy, although they may be normal themselves, are very liable to transmit the disease to their children, and should advise their sons to seek wives elsewhere. And, finally, they should be told that the misfortunes of the fathers are sometimes visited upon the children of the third and fourth generation, and that though the ones who desire to marry into their families may have normal eyes, and their parents may have had normal eyes, if any ancestor has had an hereditary eye disease, there is a latent taint that may appear at any time. Therefore, it is their duty as parents, who desire the welfare of their children, to investigate not only the moral and financial status of the one who is to enter into their family circle, but the physical status as well, and to refuse consent where hereditary eye disease exists.

APPENDIX A.*

I. Dr. L. A. W. Alleman, Brooklyn, N. Y.:

Writes: "I am in favor of the marriage of two blind persons, because I do not believe defects due to disease or accident can be transmitted. Few diseases of the eye have been proven hereditary. In syphilis, and where there is a hereditary predisposition, I should say no."

The same answer is given in the case of one blind and one seeing person. He reports the following case:

I		female	retinitis pigmentosa	15 children
II	a	male	retinitis pigmentosa	4 children
	b	female	night blindness	3 children
	c	male	retinitis pigmentosa	1 child
	d	male	night blindness	2 children
	4	?	normal	
	7	?	died young, condition of eyes not given—not counted.	
III.				
Children IIa				
	a	male	night blindness	
	b	?	normal	
	c	female	retinitis pigmentosa.	
	d	?	blind	
Children IIb				
	2	?	retinitis pigmentosa	
	1	?	normal	
Children IIc				
	1	?	normal	
Children IId				
	1	?	retinitis pigmentosa	
	1	?	normal	

(Direct heredity, 5 families; 18 children; 10 affected, 8 not; 3 fathers and 2 mothers affected.)

II. Dr. J. V. Armstrong, Supt. Tennessee School for the Blind:

"I have been a teacher of the blind for more than fifty years, but I do not remember more than three or four cases where persons totally blind married. Their children, as far as I know, had perfect vision.

I have known cases where the father was blind and the mother normal, and some of the children were either blind or their vision was very imperfect.

Nature tries to give every one a fair start in the world, but when the laws of health have been broken or totally disregarded by the parents, the offspring must be defective, either physically or mentally, and sometimes both.

However, no more than three or four per cent. of congenital blindness have come under my notice in the hundreds of children I have taught.

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*In appendices A and B the mark (?) indicates that the number of children or the sex is unknown.

I have for forty years kept strict guard over the intercourse of the pupils in this school, and there is only one instance of marriage between two of our pupils, and that instance occurred twelve years after leaving school.

A number of our men have married and also a large number of our girls, but their children, as far as I am aware, have good vision.

I have tried to get statistics as to the condition and habits of parents, grandparents and relatives generally, but have failed. People will not advertise drunkenness nor other immoralities of their kindred, and I ask only such questions as I think will be truthfully answered."

In answer to the questions, he says that he "emphatically discourages" marriages of two blind people, first, because a blind man is rarely able to support himself and could not support a wife. He advises the marriage of a blind man with a seeing person if the man is able to support a family, because he is happier and there is little probability of his infirmity being transmitted to his children.

(This is incorrect. The statistics will show that there is great danger of certain forms being transmitted to the children, when only one of the parents is blind.)

III. Prof. Th. Axenfeld, Freiburg, Germany:

(2) "I discourage it when it is a case of hereditary blindness, especially in the form of retinitis pigmentosa, congenital cataract and other congenital blindnesses. On the other hand, persons who have become blind through other forms of disease (blenorrhea, injuries, inflammations, etc.) which are not inheritable, are not a source of danger to their progeny. From a sociologic standpoint or a pedagogic, even such a marriage should be carefully considered. I would never recommend it; on the contrary, would advise against it and try to prevent it."

(4) I would permit a blind man to marry a seeing woman, if the character of the person was suitable, and if he had no hereditary blindness. I would not recommend such a marriage. I know several cases of marriages of blind men with seeing women. Some of them are happy ones. The children grew up normally. Still it is a great loss when the father is blind. The marriage of a blind women is to be forbidden under all circumstances. I cannot give names and cases."

(It is to be regretted that Prof. Axenfeld could not see his way clear to quote specific cases. Nevertheless, the words of a man of his standing and wide experience must command consideration.)

IV. Dr. Chas. H. Baker, Bay City, Mich.:

"In an experience of twenty-five years, I have not met a case of marriage between two persons blind before marriage, and have seen no cases of offspring from such parents, so have met none of the cases which come within the scope of your inquiry. In accordance with the laws of heredity, I should certainly discourage marriages between blind persons who were blind from any other cause except trauma or acquired disease."

V. Dr. M. V. Ball, Warren, Pa.:

(2, 4) "I do not discourage it."

(3, 5) "Because blindness is very seldom hereditary, and cases of supposed heredity are as likely to be coincidences as inheritance.'

(6) "I have knowledge of only one case of blindness from infancy in a man who married a sound woman, and their children are sound. One other blind man (congenital) is married, but had no children. Congenital cataract is frequently present in children of sound parents. Blindness, even if congenital, is often acquired before birth by accidents to the mother, or disturbances in the nutrition, and if so acquired cannot be transmitted. Of the many cases of blindness that I know, a comparatively few in number require the explanation of inheritance. They are caused by diseases in early infancy, at birth or shortly after. To deny marriage to such persons, where the danger in my opinion is infinitesimally small, is neither humane nor reasonable."

(Dr. Ball's letter is a fair sample of those who have opposed the proposition of preventing the blind from marrying. I think that the statistics which I have been able to collect have proved that there is very great danger that the children of parents affected with certain forms of ocular diseases will inherit the disease. As to the remaining diseases, I agree with Dr. Ball that there is little or no danger of heredity, and the question then becomes a purely economic one, in regard to which I do not feel competent to express an opinion.)

VI. Dr. A. Barkan, San Francisco, Cal.:

(2, 4) "I discourage such marriages."

(3, 5) "Danger of blindness to offspring, particularly if one or both parents have been congenitally blind, and because the offspring even though seeing is robbed of the personal care and supervision of the parent, rational, economic, and social handicap."

(6) "Records all burned in the fire of April 18, 1906."

(The arguments of Dr. Barkan have special importance from a sociologic standpoint, and makes his inability to furnish data from a medical standpoint greatly to be regretted.)

VII. Dr. Edward J. Bernstein, Kalamazoo, Mich.:

(2) "I should not encourage such marriages, though I confess I have no data in my own practice on which to base such

position, although I have had a number of congenital cataracts and congenital amblyopias."

(4) "I should discourage them, if consulted, on the general principle of transmission of hereditary blindness. I have seen two or three cases, while in Baltimore, of hereditary amaurotic conditions."

(The cases mentioned are probaly included in the literature collected.

VIII. Dr. Emil Boek, Laibach, Austria:

(2) "If I could, I would prevent it."

(3) "Because unhealthy persons should not marry, and blind ones decidedly not. The danger of inheriting any such disease is at all times great. However propitious the circumstances may be, in which these people live, they can never fulfill their duties as members of society or parents."

(4) "That I should also forbid; in any case advise against."

(5) "For the above reasons, then, also for ethical causes, because in this case, one person is tied to another who is decidedly of less value."

(6) "No."

(A very strong statement, deserving consideration.)

IX. Dr. E. T. Boyd, Leadville, Colo.:

(2) "Permit, if due to accident in both cases."

(3) "I do not think blindness in such cases entails injury to the progeny."

(4) "If not traceable to heredity, permit, barring specific cause."

(5) "I believe it safe to the offspring."

(6) "I knew a case in my boyhood. A totally blind man married a woman equally blind. They had three children, all of whom were born blind. I knew the case well but do not know the cause of the blindness."

X. Dr. H. D. Bruns, New Orleans, La.:

I can not reply categorically to all the questions in the circular. As a physician, I suppose you know that it is quite common to find in the children of one family congenital cataract, this malformation being due seldom if ever to direct inheritance from a progenitor, but usually to some degenerative influence in one or both parents. I know of a family in which three sons have congenital cataract.

A form of optic nerve atrophy with hereditary influences is well known to ophthalmologists. I once saw a healthy (to all appearances) mother and father who had two out of three children with so-called anophthalmus (congenital atrophy of the whole globe). I think I reported this case in the New Orleans Medical and Surgical Journal, or in the American Journal of Ophthalmology. Although the parents of the last mentioned cases seemed robust, I cannot doubt that if we could know all, we could have been able to trace some condition in the parents leading to the result in the children.

I doubt, however, that mere blindness in the parents is of much importance. Could we prevent the marriage of degenerates of different kinds, and especially of those tainted with syphilis, either acquired or inherited, we would accomplish much."

(Collateral heredity, 1 family, 3 children, 2 cataract, 1 not. For other case see Appendix B.)

XI. O. H. Burritt, Principal of the Pennsylvania Institution for the Instruction of the Blind, Overbrook, Pa.:

"From November, 1901, to September of this year, I was superintendent of the State School for the Blind at Batavia, N. Y. Dr. F. Park Lewis, president of our board of managers, an oculist of more than local reputation, frequently said to me that in his judgment marriages between blind persons ought to be prohibited by law. Strangely enough, at a recent meeting with my teachers here I suggested the importance of a study of the question of intermarriage of blind people, and expressed a hope that some teacher would select this subject for investigation."

XII. Dr. L. H. Buxton, Oklahoma City, Okla.:

"In my opinion, it is not a question that medical men should settle, but that physiological and sociological rules should govern as well. I do believe that a very small percentage of blindness will follow in the children of those who are blind. To these unfortunates, marriage must be the highest blessing that can come to them. They are shut off from the world, and to deprive them of the intimate association with humanity that marriage brings, would be blighting their very existence. I doubt if it would be wise to curse the lives of ninety-nine for fear that unhappiness might be brought to the other one of the hundred. I have had a few cases of congenital cataract in my practice, in none of which were the eyes of other members of the family affected."

XIII. Dr. F. J. Campbell, Principal of the Royal Normal College and Academy of Music for the Blind, London, Eng.:

(2) "From the foundation of this college, the intermarriage of blind persons has been discouraged. While the boys and girls are in the school, they are taught in different classes, and are not allowed to become acquainted with each other. Where the rule has been violated, and correspondence begun, the offenders have been expelled. Knowing that the offense is visited with this severe punishment, we have very few cases. If they intermarry after leaving school, we cease to have any communication with them, and their names are struck off the Old Pupils' Guild, and they are not allowed to visit the college."

(3) "It is impossible for a blind wife to care properly for house and children, and if the father is also blind, the condition is deplorable. Several of our old pupils who were doing well and earning a good income intermarried, and were soon seen begging on the streets."

(4) "I think a sighted wife a blessing to any blind man who has sufficient ability to support a family."

(5) "The great majority of our male pupils have married, and it has greatly increased their happiness in life and success

in business. Unless there are hereditary tendencies, it does not lead to blind offspring. In the families of our former pupils, I only know of one child whose sight is defective.

"In four instances, our female pupils have married sight men, and have been quite successful housekeepers. Two of them had considerable sight, and the mother lived with the third. The fourth went to South Africa."

(Dr. Campbell is himself blind, following an accident in his youth, and has several children with good sight. From his intimate association with the blind for many years, his words should have great weight. However, his point of view is sociologic, not medical.)

XIV. Eugenio Canora y Molero, Presidente del Centro Instructivo y Protector de Ciegos, Madrid, Spain:

"It seems that the question whether marriage between blind persons should be prohibited is a pertinent one at the present time, and scientific men interested in this matter as well as institutions devoted to this special branch should give their opinions, in order to reach a reasonable solution. And since this society has been asked for its opinion, let me as its president, state some particulars derived from the observations made during my long life among the blind.

It is inadvisable for lawmakers to introduce into the code a reform or amendment so important, to forbid the intermarriage between sightless persons. There is no powerful reason requiring such a law, and it would in my opinion, be an infringement on their liberty and rights, as well as an injury to morality and civilization. There is no reason to restrain that unhappy class from the rights of forming a family and the enjoyment of the quiet life of home. Blind men are born, and they grow and live among and like us. They feel, think and love in the same manner as we do, and if they are unfortunately placed on a level lower than us seeing people, it is only in respect to certain external sensations and not internal ones. From a moral point of view, to prohibit the marriage between sightless persons would be a mistake, because their bodies are similar to ours, and such a law would favor bringing the poor blind woman into vice.

With regard to the marriage between blind and seeing persons, this is in my opinion a most serious question, because in order for these marriages to be happy ones, the parties must have great affection, especially the seeing one towards the one who lacks sight, and both the man and the woman must be devoid of selfishness. Under such circumstances, there is no reason to discourage such unions.

The medical profession should not forbid them in order to restrict congenital blindness, because although the parents are blind, their offspring need not necessarily be as they are. In order to prove this, I will bring to your attention the following interesting data, which will throw light on the subject under discussion. First, I have known at Madrid seventy-three blind marriages, and they have had no blind children. On the contrary, very few children suffer from their sight, and they, I dare say, only on account of lack of hygiene and cleanliness in their nursing.

Second, I have known a blind couple whose older child was defective in vision, due according to the physicians, to her father's too frequent indulgence in alcoholic drinks, and a certain sickness (?) which he had in his youth.

Third, I know a marriage of seeing people with three children, two of whom are blind, and the younger at present is suffering with his eyes, and the physicians agree in ascribing the cause to their parents being of a lymphatic temperament.

Fourth, I see a real danger in permitting the marriage of persons descended from the same ancestor. I know various marriages of that nature whose children are blind, idiotic, insane, etc., all derived from the consanguinity of their parents.

Therefore, I permit and even encourage the marriage between the blind as well as that between blind and seeing persons, possessing the requirements stated above."

(This is an eloquent presentation of the arguments for allowing the blind to marry. I should like to call attention, however, to the difference in the opinions of Dr. Campbell and Senor Canora y Molero. The former absolutely forbids the marriage of two blind persons, while the latter encourages it, for practically the same reasons. The former is in favor of the marriage of a blind man and a seeing woman, while the latter allows the blind of either sex to marry a seeing of the other, only on the condition of a great affection and utter lack of selfishness. The latter is a great desideratum in any marriage, and I should judge not more frequent in the blind than in those with normal sight. The medical exceptions in the last letter are not well taken. They do not give the cause of the blindness in the parents, and the fact of children of seeing persons being blind is, as I have shown, no argument against the heredity of blindness.)

XV. J. J. Carroll and I. R. Trimble, Maryland School for the Blind:

(2) "We discourage it."

(3) "Where the trouble is congenital, it is likely to be perpetuated. Furthermore, such a marriage is not practical, and not likely to terminate happily."

(4) "If the cause of the trouble is adventitious, we would not discourage marriage."

(5) "Because we think that blind people as well as others are happily married, provided conditions are suitable."

(6) "I know of one case of two blind persons marrying. I do not know the result to the offspring, but I do know that the marriage was impractical and unhappy, resulting in the husband hanging himself and the mother and children being at the present time public charges."

Eight cases of congenital cataract are reported.

(1) I. M. W., age 15, parents normal, nothing known of ancestors.

(2) A. R., age 10, father normal; mother diseased: nothing known of ancestors; 8 brothers and sisters normal eyes; 6 brothers and sisters diseased eyes, condition not stated.

(3) M. McC., 19 years, parents normal; nothing known of ancestors.

(4) A. B., 16 years; parents normal; nothing known of ancestors; 3 other children normal.

(5) C. B., 9 years; father normal; mother cataract; 1 child normal; nothing known of ancestors.

(6) J. D., 19 years; parents normal; nothing known of ancestors.

(7) W. H., 14 years; parents normal; nothing known of ancestors; 1 other child normal; 1 cataract.

(8) E. W. M., 16 years; parents normal; nothing known of ancestors.

(We have direct heredity, 1 family; mother affected; 2 children, 1 affected, 1 not. Collateral heredity, 1 family; 3 children; 2 affected, 1 not.)

XVI. R. Brudenell Carter, London:

"I remember a family in which the five children were all the subject of congenital cataract, which was so trifling in the first as to be discoverable only by careful examination, somewhat more pronounced in the second, still more in the third, and in the fourth and fifth reached a degree which called for operation. The father of these children was a robust man with perfect vision; the mother was dead before they came under my notice, but no history of defective vision or of relationship to her husband remains in my memory. The children were all strong and healthy, and I operated on the two youngest with perfect success. I remember at least one case of congenital cataract, in which there was no history of consanguinity, the parents being of different nationalities, and I may mention one instance in which I operated for ordinary senile cataract on mother and son, the mother being far advanced in life, and the son being about fifty years of age."

(Direct heredity, 1 family; mother and 1 child affected. Collateral heredity, 1 family; 5 children, all affected.)

XVII. Dr. J. W. Charles, St. Louis, Mo.:

(2, 4) "No."

(3, 5) "Eugenic reasons."

The following cases are reported.

(1) M. H., female, complete bilateral congenital ectopia lentis; father has partial ectopia lentis; nothing known of ancestors.

(2) D. H., Jr., brother of (1); same condition.

(3) M. H., sister of (1) and (2); partial congenital dislocation of the lens, with cataract and very large cornea.

One or two other children normal.

(Direct heredity, 1 family; father affected; 5 children; 3 affected, 2 not.)

XVIII. Harvey Clark, Superintendent of the Wisconsin School for the Blind, Janesville, Wis.:

"As the records of this school have not been kept in detailed shape, I find that I am unable to answer your questions in the way you suggest. I want to say, however, that we discourage rather than encourage the intermarriage of two blind persons or of a blind person with a seeing person. As to permitting it, we do not while they are in this institution, but as our age limit is from eight to twenty-one years, they have hardly reached such an age to contract marriage before leaving school and thereafter we have no control over them. My reasons for saying that we discourage it, are that we have had, in times past, and now have pupils attending this school whose parents have been blind, and there have been from one to five blind childrn as offspring from these parents. While I realize that this is not conclusive evidence, inasmuch as there have been other offspring who are normal, I feel that there must be something on which to base an argument of this kind.

As we have no regular examining physician for this institution, and applicants are admitted when totally blind without a physician's certificate, and when partially blind, from any physician, not an oculist, you can understand my failure to give you much detailed information."

XIX. Dr. Rudolf Denig, New York City:

"The vast majority of blind people lost their sight by gonorrheal ophthalmia. I do not see any objection to the offspring of such persons marrying each other.

There is only a small class of blind people where it would be desirable to discourage unions.

As regards your proposal, each case of blindness ought to be studied by a competent oculist, as there is no doubt that some cases of blindness show a decidedly hereditary tendency."

XX. James J. Dow, Superintendent of the Minnesota School for the Blind:

"I regret that we have no data upon which to base the statistics you desire in the matter of the offspring of the blind.

In the matter of the intermarriage of the blind, it is the policy here to discourage it, and to so arrange association in the school as to reduce to a minimum the opportunities of forming attachments which might lead to such a result. After the pupils leave the school we have no power to prevent such marriages.

Our attitude in the matter of marriage of blind men with women of normal sight has been based upon the practical idea of self-support. If a blind man is in such a condition of business or financial standing as to be reasonably sure of supporting a family, we have considered it perfectly proper for him to marry. If he has not such advantages, he should not marry. The question of the transmission of blindness by heredity, in view of the comparatively small number of born-blind pupils has not entered into our consideration.

The case of blind women is somewhat different, and without particularly discussing the matter, I should not view it with favor. The practical difficulties of the management of the household by the blind wife, so as to keep the husband contented, and to retain his affection and a condition of family harmony, are so great that the risk is very considerable."

XXI. Dr. William H. Dudley, Los Angeles, Cal.:

(2) "I do not think I should try to influence the parties interested."

(3) "I have never seen, nor has a case of hereditary congenital blindness come to my notice, that I recall. On the other hand, I have known as instance in Easton, Pa., where blind people brought forth a seeing child. Unfortunately I cannot give details, as they were not patients of mine. However, in the case of an individual, with a clear history of congenital, hereditary blindness, I would advise against marriage at all."

(4) "I would not advise against such marriages if the social and other conditions were favorable."

(5) "Have never seen unfavorable results follow such unions."

XXII. Dr. U. B. G. Ewing, Richmond, Va.:

(2) "Discourage."

(3) "Lest they become a burden to themselves or the public —fear of dissatisfaction and divorce—unable to care for offspring —fear of hereditary defects."

(4) "Discourage."

(5) "Same as (3)."

(6) "No knowledge through acquaintance or patrons, nor do I find such records at our charitable institutions. Twelve or fifteen years ago, a lady patient with monocular amblyopia gave this history: her grandmother, while pregnant for patient's mother was stung in one eye by a hornet, causing blindness. The child born a few weeks or months after was also blind in one eye. Several, but not all descendants for three generations below the woman stung have monocular amblyopia."

(This is a good example of the heredity of acquired characteristics. Unfortunately neither the exact ocular condition nor the number of the descendants are given, so it is not statistically available.)

XXIII. Salvator Fuster, Colegio de Sordomudos y Ciegos de Viscaya, Bilbao-Duesto, Spain:

"Regarding this college, I would beg to state that from its foundation, thirty-six blind persons have been educated in it and none of them had blind parents, consequently I cannot give you the desired data. Personally, I do not think that marriage among the blind is desirable, for besides the hereditary influences, which I leave to the physician, and viewing the matter only of parental duties as regards the education of the children, I judge this to be extremely difficult, inasmuch as they must leave to others the important duty of parents."

XXIV. H. F. Gardiner, Principal of the Ontario Institution for the Education of the Blind, Brantford, Ont., Canada:

(2) "Discourage it."

(3) "Because a house needs at least one pair of eyes for cleanliness and to prevent poverty."

(4) "Encourage when financial conditions are favorable."

(5) "Because it is not good for man to live alone. Have no evidence that blindness is hereditary."

(Dr. Gardiner was kind enough to enclose the names of several of his former pupils, who had married, but as there was no statement as to their ancestory or descendants, they cannot be used statistically. It was deemed inadvisable to correspond with them directly.)

XXV. Dr. H. Gifford, Omaha Neb.:

(2) "Where the disease is due to post-natal causes, yes; when due to pre-natal, no."

(3) "In the former case, the chances of transmission to children is slight, or generally absent. In the latter case, chances of blind children much greater."

(4, 5) "The same rules and reasoning apply as in (2) and (3)."

(6) "I have of course seen a number of instances of the transmission of eye defects, but can recall only one case where what could be called blindness was transmitted, and even in this case the patient was really far from blind. The father had congenital cataract, but had been operated on and recovered enough sight to let him go about and make his living as a preacher. He married a woman who had trachoma, but no signs of hereditary eye defect. Their only child was a boy who had congenital cataract. The further particulars which you ask for I cannot give."

(Direct heredity, 1 family; father and 1 child affected.)

XXVI. Dr. Allen Greenwood, Boston, Mass.:

(2) "Discourage as below."

(3) "Question (2), in my opinion, depends on the cause of the blindness. When the blindness is due to congenital causes, I discourage, but when the blindness is due to accidental or preventable disease such as sympathetic ophthalmia, ophthalmia neonatorum, etc., I see no cause to prevent or discourage."

(4) "Discourage as above."

(5) "Where the blindness is due to such causes as congenital retinitis pigmentosa, hereditary optic nerve atrophy, etc., otherwise do not discourage."

(6) "I have seen two families where retinitis pigmentosa has produced blindness in offspring, and I have recently advised a mother not to let her daughter of twenty-three years of age marry. The daughter had a vision of 20/70 (in central field) with an advancing retinitis pigmentosa. The histories of these two families are so incomplete that it is useless to try and fill out the blank. I simply state that in my opinion, persons blind from some of these hereditary forms should not marry, otherwise I have no objections."

XXVII. Ricardo Gordo, Profesor de Ciegos, Colegio Nacional de Sordomudos y de Ciegos de Madrid, Spain:

(2) "I permit it."

(3) "The two following reasons apply: From a physiologic and psychologic point of view, there is no reason to object to the marriages between the blind. In my long experience with sightless persons, I have never known a single case of congenital blindness; on the contrary, in children of blind parents, I have noticed that many of them are not deranged in any way, but have good physique and strength and clear intelligence and make laborious and honest citizens. A blind person whose health is good is fitted to be married to a woman, blind or not, who is otherwise normal. From a moral point of view, these marriages must not be forbidden, for it would promote the spread of vice and adultery."

(4) "I permit it."

(5) "For the reasons stated in the foregoing."

(6) "I have, and no one has blind children."

XXVIII. Miguel Crauell, Director of the Colegio Nacional de Sordomudos y de Ciegos, Madrid, Spain:

"I received your kind letter, and am going to give you a detailed statement about what I could find on that interesting question, but I must add that besides the cases mentioned in the two communications enclosed (Canora and Gordo), I know a marriage with seven children, and only the oldest is with sight, the others being blind. They were born with sight, which they have gradually lost. I have examined their eyes, and I did not find opaqueness in them, but I believe that their blindness is due to atrophy and weakness of the optic nerves. The children are agile, they are not deranged and have great strength, with nothing abnormal. However, their parents suffer from uremy (uremia?), and their sight is some weak, for they cannot see further than 20 to 30 meters, lacking 80 centimeters necessary for normal sight."

(Collateral heredity, 1 family; 6 out of 7 children, atrophy optic nerves.)

XXIX. S. M. Green, Superintendent of the Missouri School for the Blind, St. Louis, Mo.:

(2) "I discourage the intermarriage of the blind."

(3) "First, because of possibility of transmission of blindness; second, for economic reasons."

(4) "I encourage it when blindness is not hereditary."

(5) "Better means of making a livelihood, and tendency towards normal social conditions."

(6) "Knowledge of marriage and issue is through hearsay, as marriages occur after leaving school. Our information is unusually extensive, owing to the presence of a pupil in the school who has been here since its founding in 1851. Children reported normal in sight only on positive testimony."

He reports 55 cases of former pupils who have married:

(2) A. B., female, cataract, no blind relatives; 4 normal children.

(6) A. S., female, disease unknown, but due to spinal meningitis; no blind relatives; 2 normal children; is wife of (7).

(7) F. S., male, disease unknown; ancestors unknown; husband (6).

(8) H., female, disease unknown, but congenital; parents normal; 2 brothers and 1 sister blind; 2 normal children.

(9) F. S., male, disease unknown, but congenital; brother (8) and (10), husband (13).

(10) A. S., male, disease unknown, but congenital; brother (8) and (9), husband (11).

(11) B. S., female, disease unknown, but due to spinal disease; ancestors unknown; wife (10), sister (12).

(12) A. J., male, blindness due to measles; brother (11), husband (14).

(13) B. S., female, disease unknown, ancestors unknown; wife (9).

(14) M. J., female, blindness due to pneumonia; ancestors unknown; wife (12).

(22) C. B., female, blindness due to ophthalmia; mother blind; wife (23); no children.

(23) G. B., male, blindness due to dropsy of the brain; no blind relatives; husband (22).

(28) J. C., female; congenitally blind; parents normal; uncle partially blind.

(34) L. S., female. blindness due to diphtheria; no blind relatives; 1 blind child; wife (35).

(35) O. S., male, disease unknown; no blind relatives; husband (34).

(36, 37, 39, 40) are included in the author's cases. The other cases are of non-hereditary disease, or else there are no records of ancestors or descendants.

(Direct heredity, 1 family; mother, congenital cataract; 4 children, all normal The other cases are not statistically available.)

XXX. Prof. E. von Hippel, Göttingen, Germany:

"I regret that I am unable to fill out the blank sent to me, since such a detailed history is not taken in the clinic. The question as to whether the blind should marry, or whether they should be advised to abstain therefrom, cannot be answered categorically. Every case must be decided for itself, since the answer depends on the disease causing the blindness. If it is one which can be inherited, for instance, retinitis pigmentosa, the patient should be advised not to marry, but in other cases may do so."

XXXI. Dr. C. R. Holmes, Cincinnati, Ohio:

Writes that he discourages the marriage of a blind person, only when the blindness is due to some contagious or hereditary transmissible disease.

XXXII. Samuel L. Hornbeak, Superintendent of the State Institution for the Blind, Austin, Texas:

"* * * * There is no doubt in my mind that there is no physical weakness determined by heredity more surely than defective visual organs. * * * We have in school three children born blind; one of these even without eyeballs. Another member of the same family is totally blind, and is also an imbecile. The father is completely blind in one eye, but I do not know the cause of his blindness. There are two other students that have been in school here, who have defective vision. Three brothers at home have defective vision, and the father sees out of only one eye. Another case is a girl who sees only slightly; she has three or four brothers who have to use very powerful glasses, and her father has defective vision. * * * I am very decidedly opposed to the intermarriage of the blind. I have said to my pupils often that if they intended to marry, by all means to seek out the brightest-eyed companion that it was possible for them to select. I think there are many reasons why the blind should not marry the blind. In the first place, inability to properly care for the children. Second, inability to care for each other properly. Third, the greater probability that they will transmit the inherited weakness. As a matter of fact, I believe it would be better for a person who has a mental or bodily disease that is capable of transmission by the laws of heredity to refrain from marrying."

(Not statistically available.)

XXXIII. Dr. Paul Jungmann, Breslau, Germany:

"In answer to your question concerning patients with congenital cataract as the offspring of blind parents, I desire to say that I have never seen such a case. On the other hand, I have seen three cases of congenital bilateral cataract, where the parents, grandparents and their brothers and sisters had normal eyes."

XXXIV. Dr. Hermann Knapp, New York City:

"In your case, I know of no remedy. In others, where only the husband has the defect, I know a sure remedy, let the wife take a different husband."

XXXV. Dr. R. S. Lamb, Washington, D. C.:

"I know of two cases, one of class (2) and one of class (4). In the first, Prof. B. married a blind wife. They had two children with normal vision. In the second case there were no children.

The nature of the disease or accident causing the blindness should determine the advisability of marriage. Degenerates, or those inheriting syphilis or tuberculosis should not be allowed to marry, as their children are almost of necessity predisposed to congenital blindness."

XXXVI. H. J. Linderink, Directeur Instituut tot Onderwijs van Blinden te Amsterdam, Holland:

(2) "I don't encourage such marriages. The pupils staying

in the institution till 19, there is no reason for speaking about these matters."

(4) "I would not encourage it; however, I think that if a blind man had a good-hearted, faithful and laborious wife, he would be in a better condition than as a single man. However, he should be able to entertain (support ?) both."

(6) "Marriages as in (2) have not come to my knowledge. I know under (4) several where the number of children was limited to 1 or 2. However, large families are not seldom. My experience has not afforded me the knowledge of any case where the children of a marriage between two persons, one of whom was blind, were blind or became blind. * * * *"

XXXVII. Dr. F. P. Lewis, State School for the Blind, Batavia, New York, reports the following cases:

(1) M. A. V. O., female, congenital cataract. Father, mother and 1 brother, cataract; is sister of (2).

(2) H. E. O., male, congenital cataract. Both (1) and (2) are too young to be married.

"I am very glad indeed to know that you are making inqniry concerning congenital blindness. The subject has for a long time seemed to me of great importance, and I have urged in the report to the State legislature, which will be shortly published, that the sexes be kept apart in the school for the blind before and after they reach puberty. We have in our State School for the Blind several children who are the progeny of blind parents. * * * * It must be borne in mind that blindness on the part of the parent is not likely to be perpetuated unless it is congenital. I will be very glad to give you any assistance in the matter possible, and I hope you will be able to get a sufficient number of facts to justify the enactment of preventive legislation, or to at least impress upon the blind the unwisdom of a blind person marrying one similarly afflicted. Aside from the possibility of perpetuating their own infirmity, the great importance of having a seeing associate cannot be too strongly emphasized, and the investigation which you follow will certainly be of value."

(Direct heredity, 1 family; both parents affected; 2 children, both affected.)

XXXVIII. Dr. Charles Lukens, Toledo, Ohio:

(2, 4) "Have never had occasion to advise a patient; no objections."

(3, 5) "I know of no reason why their progeny should be blind."

(6) E. F., female, wife of normal man, has optic atrophy; parents normal; nothing known about grandparents or other relatives; sisters and brothers normal; 1 child normal; 1 or more grandchildren normal. Was totally blind from age of 8 or 9, due to explosion of coal gas from a stove."

(Not statistically available; due to accident.)

XXXIX. Thos. S. McAloney, Superintendent Western Pennsylvania Institution for the Blind, Pittsburgh, Pa.:

"We do not advise, encourage or permit, if we can help it, the intermarriage of two blind persons, as we believe it is the worst thing that could possibly happen to either one. Looking at it from an economic as well as a humanitarian standpoint, the thing is entirely wrong. We do encourage the marriage of a blind person with one of normal sight, and we know of a great many happy marriages of this kind. * * * I do not find a single case of intermarriage among our pupils. Five of our former pupils, young men, have married women with normal sight. We have not a single pupil in our school whose parents are blind."

XL. Dr. E. M. Martang, Colorado School for the Deaf and Blind, Colorado Springs, Colo.:

(2) "We discourage it."

(3) "For economic reasons—to prevent bringing into the world a lot of dependents. For physical reasons, when either parent is congenitally blind."

(4) "Depending wholly on the history of the cause of the blindness and ability of the man to earn a living."

(6a) H. P., female, granulated lids, so-called. Father had same; mother normal; 1 blind brother (or sister); 1 blind child. Is wife of (b).

(b) R. P., male, cataract, thinks it is hereditary; parents said to be normal; nothing known of other relatives. Is husband (a).

(Not statistically available.)

XLI. Dr. J. L. Minor, Memphis, Tenn.:

(2, 4) "Discourage it."

(3, 5) "Because causes of blindness are transmitted from parent to offspring in many cases."

(6) "I have had a number of instances of blindness from heredity. I recall a husband and wife, each blind, having 5 children, all of whom were blind (congenital cataract). I have had other instances in which one parent only was blind, in which offspring had the same form of blindness (cataract). I think more frequently, if the mother is affected, the son inherits, and if the father is blind, the daughter inherits the trouble. I have known both parents blind and no blindness in the offspring, and the same when only one parent was blind. So the rule is by no means invariable. Other defects causing blindness I have known to be transmitted, notably affections of the nervous apparatus of the eye."

(Direct heredity, 1 family; father, mother and 5 children cataract.)

XLII. Dr. Laurenz Paly, Präsident des Schweizreichen Zentralvereins fuer das Bindenwesen, und des Luzernischen Blinde-Fuersorgevereins Entlebuch, Switz.:

(2, 3) "Discourage from an economico-social standpoint. It is medically contraindicated only in certain forms of blindness, e. g., as a consequence of syphilis, tuberculosis, scrofula, glaucoma, etc. Medically, there is no objection to the marriage of blind persons, if the blindness was caused by accident, blenorrhea neonatorum, etc."

(4, 5) "Economically, the same reasons obtain as in (2, 3), only less strongly, since at least one person is able to earn a living and to care for the children."

(6) "A law forbidding marriage between blind persons does not exist in Switzerland."

(See also Paly, Appendix B.)

XLIII. Dr. V. Pflugk, Dresden, Germany:

(2, 3) "Yes, I permit marriages between two persons who were born normal, but who, through disease, etc., have become blind. People congenitally blind (heredity) are advised not to marry."

(4) "The same as (2, 3).

(5) "Because of the danger of transmitting the blindness. Inheritance of acquired blindness is very rare."

(6a) R. W., male, congenital posterior cataract; right eye microphthalmus; his father was operated for the same condition; one of his grandparents was also operated; 1 normal brother (or sister); 1 with the same condition; 1 maternal aunt was myopic; 1 son operated for the same condition.

(b) L. W., female, normal, wife (a).

(c) W. L. M., male, bilateral amblyopia caused by perforation of an ulcer; all ancesters normal; 1 brother normal.

(d) I. L., female, aniridia congenitalis; ancestors normal; 4 children; 1 and 3 had the same disease; but are now dead; 2 is alive, has aniridia; 4 has normal eyes. Patient is wife (c).

(e, f) Husband and wife, not affected with hereditary disease; 4 children normal.

(Microphthalmus and cataract; direct heredity, 2 families; 2 fathers affected; 4 children; 2 affected; 2 not; indirect heredity, 1 family; 1 child affected. Aniridia—Direct heredity, 1 family; mother affected; 4 children; 3 affected, 1 not.)

XLIV. Dr. Geo. H. Powers, San Francisco, Cal.:

(2, 3, 4, 5) "I see no objections if they are otherwise in good health."

(6) "None in my recollection. I have seen a considerable number of cases of congenital cataract, but none born of blind parents.

XLV. John E. Ray, Principal of the North Carolina School for the Deaf and Blind, Raleigh, N. C.:

Sends the names of the following cases, students in that institution since 1893:

(1) M. C., male, blind age 1; father and first cousin blind.

(2) C. S. B., male, congenital; brother, sister and some ancestor blind.

(3) W. H., male, congenital; grandmother blind.

(4) H. V., female, blind; grandmother blind, age 50.

(5) S. E. R., female, congenital; sister and some ancestor blind.

(6) A. R. W., male, cataract; father blind.

(7) E. N. J., male, congenital; some ancestors, parents and cousins blind.

(8, 9) 2 sisters and 1 brother, congenital; some ancestor blind.

(10. 11) Twin sisters, congenital.

(13) T. L. A., male, blind from 8 years; 3 sisters, 2 brothers and parents blind.

(14) H. W., male, congenital; parents blind.

(15) C. B. A., male, blind since age 1 1-2; some ancestor blind.

(16) M. B., congenital; mother blind one eye.

(17, 18) 2 sisters born near-sighted; father's eyes weak; grandmother blind.

(19) J. T. Y., male, congenital; father blind.

(20) S. S. C., blind age 15; mother's and grandmother's eyes weak.

(21) D. C. F., male, congenital; father's eyes weak.

(22, 23) Brothers born with weak eyes; mother's eyes weak.

(24) F. S., female, weak eyes at 17 months; grandmother same.

(25) T. B., male; grandmother blind.

(26) B. T., female, blind; grandfather and 2 aunts blind.

(27) M. R., congenital; sister and some ancestors blind.

(28, 29) Brother and sister blind; mother and several ancestors blind.

(30, 31) Brother, sister and several cousins blind.

(32) M. E. H., female, partially blind; mother also.

(33) H. T., female; congenital; mother, both grandparents, 2 aunts and 3 uncles also blind.

(34, 35) Brother, sister and mother partially blind.

(36, 37) Brother and sister congenital; both parents also blind.

(38) R. B. P., female; mother partially blind.

(Unfortunately, the cause of the blindness is unknown in these cases. That they show heredity of blindness is unquestioned, especially (33) where it can be followed for three generations, with eight members affected. Cases (8, 9), judging from their names, are related to the members of the family group whose history I have given as my own case.)

XLVI. B. S. Riedle, Acting Superintendent, Illinois Industrial Home for the Blind, Chicago, Ill.:

"I know of no cases in which the children of blind couples inherited blindness. This applies to congenital cataract or blindness from any cause. We discourage marriage of blind persons on ground of financial support for self and offspring."

(Mr. Riedle gives the names of some blind persons having children with normal eyes, but as the cause of the blindness is not given, they are not statistically available.)

XLVII. Dr. Samuel D. Risley, Philadelphia, Pa.:

"If there were hereditary blindness either from optic nerve atrophy or from congenital cataract in either of the parties to the contract, I would certainly oppose it. On the other hand, in the absence of any general disease, that is to say, if the parties were in good health and the blindness due to accident, I should not feel at liberty to deny them the companionship of married life. I have a large group of patients with congenital cataract occurring after the usual fashion in different members and successive generations of the same family, whose family history I hope to publish when I can find the time."

XLVIII. Dr. W. C. Rockliffe, Hon. Ophthalmic Surgeon to the Hull Blind Institution, Hull, Eng.:

(2) "Discourage."
(3) "As productive of poverty, filth, jealousy, immorality."
(4) "Permit."
(5) "Have no say in the matter. Why not?"

(6) "Too many to enumerate. We have some blind couples connected with the institution, and many others I know personally, with 3, 4 and 5 generations of congenital cataract. Your query surprises me as coming from a qualified medical man, as it is a well-known fact that congenital cataract and retinitis pigmentosa are the only transmissible blind affections, and that the former is most common and usual in one or more of the family of persons so affected, and that the latter occasionally so occurs, or as a sequel to inherited syphilis."

(In answer to the above, I can say only that from my investigation I find that quite a number of physicians disagree with Dr. Rockliffe.)

XLIX. Dr. G. Sterling Ryerson, Toronto, Canada:

"In the 28 years I have been in practic here, I do not know of a single instance of the marriage of two blind persons. I know of two blind men who married seeing wives. One couple had no children; the other had two healthy children when I last heard of them. Of course, I have seen families of cataract and pigmentary retinitis, but so far as I know, neither parent was blind at the time of the marriage. I have now under my observation a man aged 33, who is one of four suffering from pigmentary retinitis, the parents being first cousins, but without visual defects so far as I can ascertain."

(Collateral heredity, 1 family; 4 children affected with retinitis pigmentosa.)

L. Charles H. B. Shears, Ophthalmic Surgeon to the Liverpool Workshops for the Blind, Liverpool, Eng.:

"By the rules of this institution, no blind man or blind woman is allowed to remain if she or he marries another blind person." He encloses the following rule:

No. 11. The Committee having seen so much misery result from the marriages of blind with blind, feel it their duty to discourage such unions, and will at once dismiss any person in their employ who may henceforth break through this rule."

LI. Prof. A. Shimanowski, Director of the Clinic of the University of St. Wladismir in Kiev, Russia:

(1) "I permit the intermarriage of two blind persons."
(3) "I do not remember that such intermarriages result in blindness to the offspring; on the contrary, I remember families of one or two blind parents who had healthy children."
(4) "I permit."
(5) "I have no reason to the contrary."
(6) "I know nothing."

LII. Dr. Robert G. Loring, Boston, Mass.:

(2) "Would advise only when blindness is acquired and not congenital. Would forbid any congenital case, or when due to inherited syphilis. Economically, it always seems unwise."
(4) "Do not permit when blindness is congenital."
(5) "On account of fear of transmission—on general principles."
(6) "I have hearsay records, but nothing more definite. Rely on memory of cases for above views. Have distinct impression from questioning patients suffering from cataract (congenital), retinitis pigmentosa, etc., that there is a history of transmission."

LIII. Dr. William T. Shoemaker, Philadelphia, Pa.:

(2, 4) "Medically, I am indifferent to the marriage of parties mentioned provided the blindness is acquired. If hereditary in character, much would depend upon environment, which greatly influences the development of hereditary tendencies. The females in a family in which there is hereditary optic nerve atrophy should, I think, not marry. I am opposed to further legislation that would prohibit the marriage of those mentally sound, who are otherwise legally qualified. People have a right to marry, and doctors have no right to prevent them."

LIV. Dr. E. M. Singleton, Marshalltown, Iowa:

(2, 4) "I would discourage it."
(3, 5) "Because certain eye diseases are hereditary."
(6) "I know a family where the wife's father was blind; her husband went blind from glaucoma, and now 2 of their children, who have grown up, have glaucoma."

(Direct heredity, 1 family; father and 2 children glaucoma.)

LV. Dr. W. G. Snyder, Toledo, Ohio:

Has never seen a case of the marriage of two blind persons. He has advised against the marriage of highly myopic persons, but has never had his advice followed.

LVI. Dr. F. R. Spencer, Boulder, Colo.:

(2) "I discourage it."

(3) "Reasoning from other diseases, I have feared congenital cataract."
(4) "I have permitted this."
(5) "Because I have felt that the danger was extremely slight, if any."
(6) My records do not give any information, nor do I know of any cases my colleagues have seen."

LVII. Dr. Frank C. Todd, Minneapolis, Minn.:

(2, 4) "I do not permit it if I can help it, provided the parents have a disease which is congenital or inherited; the chances of a child being blind in such a case are great. This does not hold true in cases of acquired blindness."
(6) "Have many cases in which the tendency can be traced."
C. L. D., 23 years of age, has hereditary cataract: father's eyes normal; mother had cataract; maternal grandfather, 2 uncles, 5 aunts, 3 brothers, several cousins, all had cataract; 2 sisters, 2 brothers and several cousins normal; 1 child normal, age 4 1-2.

(Direct heredity, 3 families; 1 father and 2 mothers affected; 17 children; 12 affected, 5 not. The history of the cousins is not statistically available.)

LVIII. Dr. Francis Valk, New York City, N. Y.:

(2, 4) "I would not encourage or advise, yet would not discourage."
(3, 5) "Because I believe heredity bears too small a part in these conditions."
(6) "I have no records or hearsay of such marriages, but have seen many cases of congenital defects in children whose parents had good vision."

LIX. Dr. B. Van Note, Lima, Ohio:

Writes that he discourages the marriage of two blind persons. He gives the following history of cataract in a family:
(1) Mrs. A. H., cataract developed in girlhood; 3 sons and 1 daughter had cataract at ages 15-19.

(Direct heredity, 1 family; mother and 4 children cataract.)

LX. Dr. John E. Weeks, New York City, N. Y.:

(2) If the blindness is acquired, that is, not congenital or due to heredity, I see no objection to intermarriage. In cases of congenital cataract, and in blindness due to herdity, as in retinitis pigmentosa, optic nerve atrophy and some cases of glaucoma, one or more of the offspring are liable to be affected. In these cases, intermarriage should be advised against.
(4) "I would acquaint the parties with the danger to the offspring, but would not go further. The danger from the mother is greater than from the father. Not so much danger to the offspring as when both parties are congenitally blind or blind through heredity."

(6) S. A. R., age 32, congenital cataract; normal parents; 1 blind uncle and 1 blind sister (cause not stated); 1 son with congenital cataract.

(Direct heredity, 1 family; father and 1 child cataract.)

LXI. Dr. Casey A. Wood, Chicago, Ill.:

"* * * * If you will permit me to draw your attention to my work on hereditary cataract, I believe it will form at least a minor argument against the marriage of persons with hereditary diseases of the eyes. Some years ago, I published an example of hereditary nystagmus affecting four generations; indeed, I believe that the evidence against the advisability of marriage of blind persons is overwhelming.

(See also Wood, Appendix B.)

LXII. Dr. Hiram Woods, Baltimore, Md.:

(2, 4) "I have never had the question presented."

(6) "I have seen certain eye defects—or tendencies to such eye defects handed down from one generation to another. I have seen dislocated lens in 2 successive generations, cataract develop at an early period in mother and daughter. On the other hand, all these eye diseases have been observed more frequently where there was no hereditary tendency. Retinitis pigmentosa seems to be more or less founded on family tendency. In the case of a young man whose sister had the same disease, but whose parents were normal, I discouraged matrimony."

(Direct heredity, 1 family; mother and daughter cataract. Collateral heredity, 1 family; 2 children retinitis pigmentosa.)

The following arrived too late for insertion in alphabetical order:

LXIII. Dr. Wm. Campbell Posey, Philadelphia, Pa.:

Kindly allowed me to read the manuscript of an article on the dangers of consanguineous marriages from an ocular standpoint. Such marriages are more to be deplored when there is already an hereditary taint, as the two strains reuniting in the child, almost invariably lead to ocular disease.

LXIV. Dr. W. H. Merrill, Lawrence, Mass.:

Discourages such marriages if the blindness is due to congenital defects. Reports following case:

Mrs. W. P. N., retinitis pigmentosa.

John P. N., son of above, coloboma of the iris and chorioid.

(Dissimilar heredity.)

LXV. The Massachusetts Commission for the Blind:

"The Commission has had no occasion to adopt any policy respecting the marriage of blind persons either with one another or with seeing persons."

The following cases are reported:

(1, 2, 3, 4) 3 brothers and 1 cousin atrophy of the optic nerve.

(5, 6) Brother and sister, children of consanguineous parents, began to lose sight at age 20 and 25, cause of disease not stated.

(7, 8) 2 brothers blind from ophthalmia neonatorum.

(9, 10) 2 brothers, children of consanguineous parents, were congenitally blind, cause not stated. There are other cases in the family.

(11, 12) Son blind from detachment of the retina; mother supposed to have had the same condition.

(13, 14) Nephew, atrophy optic nerves; aunt blind, cause not stated.

(15, 16) Husband, ulcer of the cornea; wife, trauma; child normal.

(17) Patient has "peaked pupils" and nerve defect since birth; was totally blind at age 1 1-2; 2 brothers and 1 sister blind; uncle and aunt blind, due to trauma; a cousin blind, said to have been moonstruck.

(18, 19) Brother and sister blind from trauma.

(20, 21) 4 brothers blind, cause not stated.

(22, 23) 2 sisters blind; 1 from scarlet fever; other from some disease, kind not stated.

(24, 25) 2 brothers partially blind from birth; cannot distinguish colors or read ordinary print.

(26, 27) Father blind from malaria; son blind from locomotor ataxia.

(28, 29) Father, cataract; daughter, ulcer of the cornea.

(30) Patient partially blind, cause not stated; 1 brother, defective sight.

(31, 32, 33, 34) Parents cousins; 2 children, twins; 4 congenitally blind.

(35, 36) 2 brothers partially blind; 1 of disease, the other of sunstroke.

(37, 38) Brother and sister congenitally blind.

(39, 40, 41) 2 brothers blind; 1 of disease, the other of sunstroke; sister blind, disease.

(42, 43) 1 brother congenitally blind; 1 brother, disease.

(44) 1 brother blind from scarlet fever, 1 born blind.

(45, 46) 2 brothers congenitally blind.

(Unfortunately, most of the above examples are statistically unavailable, on account of the character of the disease being unknown. There is, however, collateral heredity, 1 family; 3 children affected with optic nerve atrophy.)

LXVI. Dr. Komoto, Tokio, Japan:

(1) "Congenital anomalies are dangerous for the offspring; in some cases, a child is born blind.

(2) "All ocular anomalies are more or less dangerous, especially, however, coloboma, cataract, and vitreal bands.

(3) "Whoever has a congenital anomaly should take into consideration the fact that his children may have the same condition to even a higher degree.

(4) "Whoever has a congenital ocular affection should be examined before his marriage by an oculist, to see whether it is a dangerous condition for his children, and if so, both parties to the marriage should be so informed.

(5) "It would probably be advisable to have inserted in the official marriage document a statement in regard to congenital ocular conditions and the danger to children.

(6) "Who attempts statistically to determine the danger from congenital anomalies, should request every oculist to examine the children of the patients for the same lesion."

He reports the following cases:

(1) Parents normal; 2 daughters congenital cataract; 1 son normal.

(2) Father had bilateral vitreal bands; his only son had the same.

(3) Father normal eyes; mother microphthalmus and irido-chorioidal coloboma; their child has microphthalmus of a high degree, and is almost blind. This case is characteristic of the danger to the child of congenital anomalies in the parent.

(4) 2 children with anophthalmus.

(5) 3 sons congenital dislocation of the lens; all daughters normal.

(The last (5) is not statistically available. Direct heredity, 1 family; mother and son microphthalmus. Collateral heredity, 1 family; 2 children anophthalmus. Collateral heredity, 1 family; 3 children; 2 cataract, 1 not.)

LXVII. Dr. A. E. Ewing, St. Louis, Mo., reports the following case:

(1) T. D. T., male, cataract, O. D., well developed. Aphakia, O. S., and retinitis pigmentosa, O. S. His mother had night blindness.

(2) W. N. T., male, son of (1). Marked cupping and pallor of right disk. Retinitis pigmentosa in peripheral portions of both eyes.

(3) D. B. T., son of T. D. T. Is troubled a little with night blindness. Ophthal. shows small pigment spots in the fundus, but not of characteristic stellate form. Vessels of good size. Three years later: trouble in getting around at night has increased; vision normal both eyes; characteristic stellate pigmentation both eyes.

(4) V. D. T., daughter of T. D. T. Has never been able to see well at night. Examination with the ophthalmoscope shows right media and fundus apparently normal in every respect. O. D., a small black spot in the upper peripheral portion of the fundus, not typical; in the lower portion a slight greyish retinal change, also not typical; fundus otherwise normal.

(5) M. E. T., daughter of W. N. T. Unable to see well at night since early childhood. With dilated pupils get no pigmentation of the retina. Vision 20/15, both eyes; fields normal. Three years later, typical pigmentation of both retinae; moderate contraction of fields.

(There is every reason to believe that Miss V. D. T. would also develop the characteristic pigmentation, but she is here counted as normal: Direct heredity, 3 families;

1 mother and 2 fathers affected; 5 children; 4 affected, 1 not.)

Author's Own Cases.

LXVIII. See beginning of paper.

(Direct heredity, 6 families; 5 fathers and 1 mother affected with cataract: 12 children, all affected.)

LXIX.

Mrs. G. H. R., papilloma of the caruncle. Her mother, maternal grandfather and great-grandfather each lost the sight in the left eye, but patient was unable to state the cause.

(Not statistically available.)

LXX.

Mrs. A. R., her brother and 3 children, had convergent strabismus; 6 other children had normal eyes.

(Collateral heredity, 1 family; 2 children, both affected. Direct heredity, 1 family; mother affected; 9 children; 3 affected, 6 not.)

(TO BE CONTINUED.)

SOME COMPARISONS BETWEEN THE EYES OF INSECTS AND OF MAN.

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At the request of the editor of the *Annals,* some account of the eyes of insects is herewith presented, dealing more especially with the differences in the exercise of the visual functions in these creatures and in man.

The human being possesses two movable eyes, of the camera type, normally capable of focussing on objects at very different distances. An insect may possess from two to fifty eyes, immovable, not of the camera form, and of a very limited and doubtful power of focussing.

From the time of birth the human eye retains the same type of structure until death in old age, while the great changes through which many insects pass after hatching until they become adult, are very frequently accompanied by alterations in the number and in the structure of the visual organs.

Insects' eyes are usually classified as simple and compound. The latter are larger and are commonly recognized as eyes. Examined under a pocket lens their surface appears to be covered with a fine network, whose meshes, under higher magnification, are usually six-sided. Each six-sided mesh is in reality the surface of a biconvex lens, and the whole eye therefore possesses as many lenses as there are "meshes" on its surface. Corresponding to, and beneath each surface lens is a bundle of cells (crystalline cone, pigment, and retinula cells) elongated at right angles to the surface of the eye. Each bundle is more or less wrapped around with pigment and is so marked off from the neighboring bundles. Such a bundle, with its biconvex lens at the external surface of the eye and its nerve fiber or fibers at its inner deeper end, is technically an *omma-*

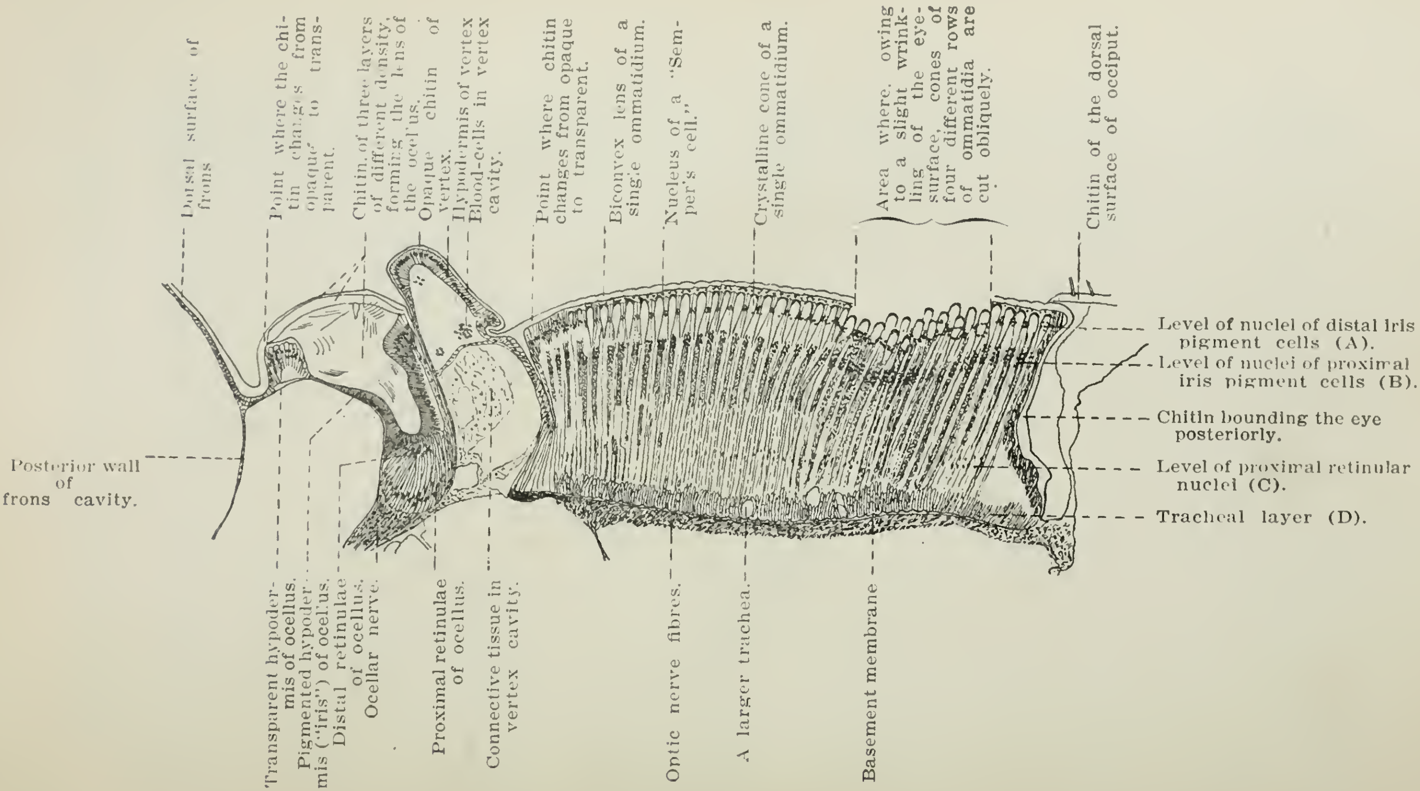
Dorsal surface of frons
Point where the chitin changes from opaque to transparent.
Chitin, of three layers of different density, forming the lens of the ocel'us.
Opaque chitin of vertex.
Hypodermis of vertex
Blood-cells in vertex cavity.
Point where chitin changes from opaque to transparent.
Biconvex lens of a single ommatidium.
Nucleus of a "Semper's cell."
Crystalline cone of a single ommatidium.
Area where, owing to a slight wrinkling of the eye-surface, cones of four different rows of ommatidia are cut obliquely.
Chitin of the dorsal surface of occiput.
Level of nuclei of distal iris pigment cells (A).
Level of nuclei of proximal iris pigment cells (B).
Chitin bounding the eye posteriorly.
Level of proximal retinular nuclei (C).
Tracheal layer (D).
Posterior wall of frons cavity.
Transparent hypodermis of ocellus.
Pigmented hypodermis ("iris") of ocellus.
Distal retinulae of ocellus.
Ocellar nerve.
Proximal retinulae of ocellus.
Connective tissue in vertex cavity.
Optic nerve fibres.
A larger trachea.
Basement membrane

FIG. 1.—A sagittal (vertical longitudinal) section through the dorsal part of the head of a dragonfly (Anax junius ♀), recently transformed, showing the median ocellus and about forty ommatidia of the compound eye. x 28. (From original section and drawing by P. P. Calvert.)

tidium. A compound eye is therefore an aggregation of ommatidia, the number of which varies from 2 to 27,000 in different insects, and appears to bear a direct proportion to visual power and to quickness of movement. The crustacea have similarly constructed compound eyes.

The simple eyes, or ocelli, of insects, have only a single lens, which is larger than the lens of an ommatidium, circular or elliptical in outline, but similarly situated at the surface of the head. The arrangement of the internal parts of a simple eye has been compared with that of one or of a number of ommatidia, so that the simplicity lies chiefly in the fact of the possession of but a single lens. A compound eye is not now regarded as an aggregation of simple eyes.

The compound eyes are usually two, but in some forms are divided each into two, giving four in all. The simple eyes may be from one to fifty. When an uneven number is present, one simple eye occupies the median line, the others being arranged symmetrically on each side of the head, as is also the case when an even number of simple eyes exists. There is evidence that the median ocellus is really due to a fusion of two such structures.

Allusion was made above to changes in the number and structure of the eyes during the life of insects. Larval and adult grasshoppers and roaches have compound eyes, so do the larvae and adults of dragonflies: the last named insects only acquire simple eyes, in addition to the compound, upon transforming to the winged condition. Caterpillars have no compound eyes, but on the site where these organs are to appear in the butterfly are a few isolated simple eyes. The butterfly, on the contrary, lacks simple eyes. Among the bugs, different families are distinguished by the presence or absence of simple eyes in the adult—compound eyes being present in all.

The lens or lenses of simple or of compound eyes, respectively, are composed of the organic substance *chitin*, which forms the cuticle of the entire body. The transparent lenticular chitin is continuous with the often opaque chitin of the rest of the surface of the head. In the shed or moulted "skin" of insects one can easily recognize the lenticular chitin by its greater transparency as compared with that of adjoining areas. The chitin of the head generally is firm and rigid and one of the results of the continuity of the lenticular chitin with that of surrounding parts is the immovability of the eyes. It is true that in some beetles, for instance, the eyes are set in sockets, but in no case is there any movement of the eye within the socket, nor anything to correspond to the eyeball muscles of the vertebrates. When, therefore, an insect changes its field of vision it can do so only by turning the entire head, or, in some cases, when the head is so closely fitted into the thorax that independent motion of the head is extremely limited, by moving a larger or smaller anterior section of the body. Many of the crustaceans, as the crab or the lobster, possessing compound eyes similar to those of insects, have a greater power of visual exploration in that each eye is mounted at the tip of a stalk, which can be thrust out of a socket, turned in various directions, and again withdrawn. Curiously enough, no known insect has developed such a functional advantage, since even the apparently stalk-eyed fly Diopsis of Africa has the stalks completely immovable.

This lack of movability is, however, often compensated for by the relatively large size of the compound eyes as compared with that of the head, and by their convexity. Other things being equal, a larger eye means a greater number of ommatidia, and increased convexity results in the ommatidia being directed along a greater number of radii. The field of vision is thereby largely increased without requiring any head movement. The increase in eye-area is shown in some insects as a sexual difference, the males of hive-bees, may-flies and horse-flies having larger eyes than their mates. In the drone, or male hive-bee, the increase is chiefly on the upper surface of the head and is thought to be correlated with the habit of these insects of pairing high in the air, the drone therefore having to look upward, if we may so express it, in his search for the queen.*

The lenticular chitin, like that of the rest of the body, is ordinarily dry, and in this respect the insect eye offers another contrast to the human or vertebrate eye generally, with its moist conjunctiva. No insect eye is specially protected against dust or foreign bodies by any structure comparable to eyelids or nictitating membranes. On a few insect eyes, such as those of the hive-bee, which has just reached the winged condition, between the lenses there are found a few delicate hairs. Although these are but temporary structures, it is quite possible that they may resemble eyelashes in performing the function of a "dust break."*

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*Phillips, Proc. Acad. Nat. Sci., Phila., 1905, p. 134.

The range of color of insects' eyes is very great. Thus within the group of dragon-flies alone are to be found the brilliant scarlet of Telebasis salva, the sky-blue of certain Enallagmas and Aeshnas, the resplendent emerald green of Somatochlora and Macromia, the lilac of various Gomphus, while some of the Libellulas have their visual organs Indian red above, grading into a light green below. Almost everyone knows a fly somewhat larger than a house-fly, with a dark band across each wing, and which often inflicts a painful bite on man or beast, drawing the blood. This is Chrysops, whose eyes are golden green, marked with dark spots, but the pattern of these spots is sufficiently different in the different species of Chrysops to enable students of the flies to identify the species thereby.†

As to the significance of the color of insects' eyes, little or nothing is known; the bright tints usually fade quickly after death. In life they are often due to the reflection from pigment, forming the iris tapetum of Exner, lying between the crystalline cones, but external to the more abundant black pigment known as iris pigment. The iris tapetum, by reflection, tends to eliminate too oblique rays of light from the inner eye.

Although the eyes of man and of vertebrates generally are known as camera eyes, many of them differ widely from a photographic camera in their manner of focussing upon objects at different distances. In man, mammals, birds and most reptiles, the curvature of the lens is altered, while the distance from the lens to the retina remains nearly or actually constant; in the photographic camera the curvature of the lens is constant, but the distance between the lens and the sensitive plate (retina) is altered. In some molluscs (i. e., dibranchiate Cephalopods), bony fishes, Amphibians and some snakes, accommodation is accomplished by alteration of the distance between lens and retina. In the insect eye the curvature and density of the lens are constant; so also are the shape and density of the transparent and soft crystalline-cones or crystalline bodies lying beneath the lens, and which also have a dioptric function. Any accommodating power which an insect eye possesses must therefore result from an alteration of distance between lens and crystalline bodies on the one hand, and the retinulae, or end cells of the optic nerves, on the other. Exner, whose "*Physiologie der facettirten Augen von Krebsen und Insecten*" (1891), remains the most extensive and thoroughgoing work in this field, was unable to detect the existence of any apparatus having this power. He suggests that accommodation is rendered unnecessary by the thickness of the retinal layer (retinulae), which permits images of external objects at different distances to fall within that layer.

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*cf Phillips, l.c. p. 133.

†See Daecke, Ent. News, XVII, p. 39, plate I, 1906.

A more recent writer (Hesse, 1902*) on the eyes of lower invertebrate animals, similarly accepts the view that accommodation does not exist in insects' eyes. On the other side, Vigier (1904†) has described certain fibrillae in the eyes of dragon-flies which, he believes, shorten the ommatidia and diminish the curvature of the surface of the eye. No experimental evidence on the existence of accommodation appears to exist.

The lens of each ommatidium of the compound eye, together with its crystalline cone (when present), forms a dioptric apparatus, considered by Exner as a cylinder-lens, and throws its pencil of light rays upon the retinulae. This pencil of rays proceeds from a limited portion of some external object. The number of such lenses transmitting such pencils from a single object to the retinulae depends largely upon the degree of divergence of the ommatidial axes. The light rays on reaching the retinulae either overlap each other, forming there one image, the superposition image of Exner, or in other eyes, instead of overlapping, fall near each other and give rise to what Exner styles an apposition image.

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*Zeitschr. wiss. Zool., LXXII, p. 641.

†Compte-Reud. Acad. Sci., Paris, CXXXVIII, pp. 775-7.

The difference is due to a greater (superposition image) or less (apposition image) distance between the crystalline cones and the retinulae. Exner has photographed a distant church steeple, the rays of light from which passed through a closed window (on one of whose panes was pasted the letter R, cut from black paper), an extirpated compound eye of a fire-fly, and lastly through a microscope, on their way to his photographic plate. The photographic print, enlarged, forms the frontispiece of his book above quoted, and in it one may easily recognize the steeple, the sash-partitions and the letter. The images, whether superpositional or appositional, formed by compound eyes, are erect.

How much an insect sees has been discussed for many years. Plateau* found that in a number of winged diurnal insects, after covering all the eyes, compound and simple, with an opaque varnish, or after cutting the nerves of all the eyes, the insects, when liberated, flew vertically upward to a great height. If, in the same kinds of insects, the compound eyes were varnished, or their nerves cut, leaving the ocelli untouched, the behavior was exactly as if all the eyes were treated as above. When the use of the ocelli only was suppressed, the behavior was as in normal insects. From an extended series of experiments he concluded that the simple eyes of insects have almost no utility, and that the compound eyes do not give distinct perception of form, although giving impressions resulting from shadows and from reflections; that, when visiting flowers, odors or masses of color serve as guides, mistakes being frequently made which are only corrected at very short range; that movements or odor of animal prey or of the other sex, or of an enemy, alone permit capture of food by carnivorous insects, sexual union and escape from danger.

Exner, too, contrasting the vertebrate eye with the compound insect eye, regards the former as serving in a more perfect manner for the recognition of the form of external objects, the latter in a more perfect manner for the recog-

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*Bulletins, Acad. Belg., XIV-XVI, 1886, 1888, etc.

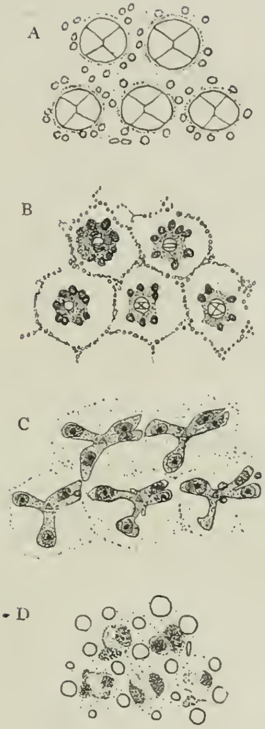

Fig. 2. Four cross-sections at the levels A, B, C and D of figure 1, each of five adjacent ommatidia. x250. (From original sections and drawings by P. P. Calvert.)

In A, the crystalline cones, each of four cells, are cut; between the cones are the small round nuclei of the iris pigment cells.

In B, the inner, or proximal, tapering ends of the cones are cut; around each cone, at a little distance away, are 5-9 nuclei of the proximal iris pigment cells; the boundary of each ommatidium is marked off by pigment granules.

In C, four (or in one case three) retinulae are seen in each ommatidium, each with a large nucleus and conspicuous "nucleolus"; where the four retinulae meet is the triangular rhabdom occupying the centre of each ommatidium.

In D, the clear circles are cross-sections of tracheae whose distinctly hexagonal arrangement marks out the limits of the ommatidia; a pair of pigment-cells is seen in each ommatidium; many of the small dots represent nerve fibres passing from the retinulae to the retinular ganglion.

nition of the movements, or, as he later preferred to say, the changes, in objects. So also Heycke.[†]

Johannes Müller considered the simple eyes to be for the seeing of near objects, and recent writers, like Buttel-Reepen (1903), tend toward this view, obtaining from their experiments and observations results different from those of Plateau.[‡]

When the human eye is focussed on near objects, or when it passes from light into darkness, the pupil is dilated admitting a larger amount of light. By comparing the eyes of certain insects kept in the dark and killed in the dark, with those of the same species kept in the light and killed in the light, Exner found in the former much pigment between the cones of adjacent ommatidia, while in the latter this same pigment lies farther in than the cones. The massing of the pigment between the cones (dark position) permits the participation of a greater number of ommatidia in the formation of a retinal image, for the inward movement of the pigment (light position) cuts off the light from many of the more peripherally placed ommatidia. This movement of what Exner styled the iris pigment was observed only in nocturnal species which use their eyes both by day and by night and which form superposition images, such as the fire-flies and night-flying moths.

Various authors have observed the greater diameter of the ommatidia in nocturnal as compared with diurnal insects, and have explained their difference as permitting the entrance of more light in the former. The size of the ommatidia in each case is fixed and cannot be altered by exposure to varying degrees of illumination.

In not a few insects the ommatidia of the upper and lower parts of the same eye are of different sizes, the transition from one size to the other being quite abrupt in the dragon-flies. In insects in general, the smaller the diameter and the greater the length of lens and crystalline cone, the sharper (but darker) the "image" and the smaller is the field of vision of the ommatidium in question. The size of the image of the external object formed by a number of ommatidia is proportional to the radius of curvature of that part of the eye in which those ommatidia are located. In some dragon-flies' eyes the lenses of the upper surface have a diameter twice as great as those of the under surface, and Exner holds that the upper ommatidia serve for the perception of movements, the lower for the perception of stationary objects. Since all experimenters are agreed that distinct vision in insects is at the best limited to objects not more than two meters distant and that their ability to see stationary objects is much less developed than their ability to perceive movements, it may be that in the upper and lower parts of the compound eye of a dragon-fly we have a difference that will interest the ophthalmologist as furnishing an example of a bifocal apparatus.

[†] Allegemein. Zeitschr. Ent., VIII, p. 206, 1906.

[‡] Ibid.

Again Hesse, working on the minute details of a dragon-fly's ocellus or simple eye, concluded that both layers of cells, marked "distal" and "proximal retinulae" in our figure 1, are the terminals of nerve fibers and that owing to their arrangement in two layers, images formed by the ocellar lens can be focussed at two different levels. The distal retinulae, he considers, lie at the focus for farther external objects, the proximal retinulae at that for near objects. "We have here at once simultaneously far and near vision in the same eye, vision with two retinas lying one above the other. I know of no similar arrangement anywhere. It is significant that eyes so relatively highly formed occur in predatory and very active animals as the dragon-flies are."* In considering the value of such a bifocal apparatus, it must be taken into account that the convexity of such an ocellar lens as that figured by Hesse, or shown in our figure 1, is so great that the focal length must be very short.

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*Zeitschr. wiss. Zool., vol. LXX, pp. 380-384, 1901. It should be added that in the ocellus which he figures (Fig. 26) the iris does not extend between lens and distal retinulae as in our Fig. 1.

THE OPHTHALMIC ORIGIN OF OTIC DISTURBANCES WITH THE CEREBELLAR CONTROL OF THE EYES.*

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The argument of a medical thesis is more easily understood and more accurately followed if its propositions involved are clearly stated at the beginning. I desire to say at once, therefore, that it is my purpose in this paper,

1st—To call attention to the fact that clinical evidence shows that such relationships exist between the eye and the ear that an irritation or improper functioning of the former may be manifested in a disturbance of some character in the latter.

2d—To show anatomically what these relationships are.

3d—To show that a complexus of symptoms closely resembling those of Meniere's disease may be produced through incoordinate action of the eyes, and,

4th—This is of especial importance—to show that in the physiology of vision the cerebellum exercises governing functions.

Concerning the first point, the establishment of the conclusion that an irritation of a disturbing character may be transmitted through the mechanism of the central nervous system from the eye to the ear, would almost necessarily assume as its corollary the reverse proposition that a like influence may be exerted through the ear upon the eye. With this phase of the subject the present paper will not deal.

While examining the refraction some years since of a woman not yet presbyopic she mentioned incidentally that for some months she had been under the care of a distinguished otologist seeking relief from an annoying fluttering and tinnitus affecting her left ear. The Eustachian tube was quite patent, and there was no retraction of the membranum tympanum, nor was there an actual loss of hearing, but a confusion was produced in the act of conscious attention that was most disturbing. These facts were recorded as a part of her case history, and her refraction was determined. Her eyes seemed to be free from disease of any kind and she complained of nothing except discomfort in using her eyes and *an increase in the ear symptoms when the eyes were used for close work.* Her refraction was carefully taken and she was given the following prescription for glasses for constant wear and was not seen again for several months:

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*Read at the Thirteenth Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, Cleveland, Ohio, August 28, 1908.

R. + 0.50 D. cyl. ax. 15 v-20/20.
L. + 0.62 D. cyl. ax. 165 v-20/20.
Her muscle balance showed orthophoria.

She then reported that shortly after having assumed glasses, to her astonishment and to mine, not only were her eyes made perfectly comfortable, but the disturbances of the ear also rapidly and entirely disappeared. There was no return of any of these symptoms for more than a year, when her eyes again became somewhat uncomfortable, and with this her attention was called to the same distressing sensations in the ear. A slight alteration in the angle and strength of her cylinders was found necessary, after which she again found perfect relief from both of the conditions from which she had suffered.

An association of functional disturbances seemingly correlated and involving both the eye and the ear seemed to me to be most unusual and most important. That organic changes involving the meninges or the brain structures may affect both the sight and hearing is common knowledge, but that an irritation having an origin in the eye may be transmitted to the ear was at that time absolutely novel in my experience. The woman was indeed somewhat neuropathic. She had been subjected to a nervous strain resulting from domestic unhappiness and her nervous system was therefore more keenly alive to impressions, but the fact that such impressions can be, and in even one instance were, carried through the nerve centers controlling the eyes to those governing the auditory mechanism is of profound importance in charting the pathways of associated functions in unknown parts of the brain, and in possibly contributing to our knowledge of pathologic conditions that are now obscure.

My attention having been directed to the possible relation between these two organs, three questions naturally presented themselves:

1. Was this a unique manifestation, or has it been observed by others?

2. If the pathway exists through which impulses which originate in or are carried to the eye centers, may be conducted to those of the ear, may not other sensations follow these same channels?

3. Through what machanism must this be accomplished?

Before having an opportunity of investigating the literature touching on this subject, some additional facts occurred under my own observation. Another patient, again a woman, presented herself with that exceedingly common evidence of eye-strain, pain in the back of the head extending down into the neck, but the peculiar association symptom—which I have since noted in many cases—was an intense but transitory pain extending deep down into the ear. The pain was on the side in which it was greatest in the neck. The correction with proper glasses, of the eye-strain which relieved the pain in the neck, at the same time relieved that in the ear. We have then another possibly associated symptom, that of pain. Since having my attention awakened to possible relationships of this kind, I have noted not once, but many times, sensations of vague discomfort—a fullness, or stuffiness, or sensation as of water in the ears—which have been referred to the ear which have been increased by the use of the eyes, and which have disappeared with the relief of the symptoms of the head for which glasses had been prescribed.

Associated with this complexus of symptoms is another not often ascribed by neurologists to a condition that is probably more frequently its true source than any other, and that is ocular vertigo. Peterson and Church describe six different causes of vertigo, but do not mention the eyes as one of them. The following is a typical instance:

F. M. H. Aet. 44. Merchant. While engaged in his business during past three months has had repeated and increasing attacks of dizziness. Things seem to whirl rapidly around; he grows pale and apprehensive. Has never worn glasses with regularity, those which he had occasionally used being focally incorrect. In recent attacks, vertigo was so intense that he was obliged to lie down. Was unable to walk because of dizziness and was brought to my office in a carriage.

His muscle balance was normal, but his refraction under cycloplegic showed:

R. + 0.50 D. sph. + 1 D. cyl. ax. 180 v-20/20
L. + 0.25 D. sph. + 1.25 D. cyl. ax. 180 v-20/20

He was given bifocal correction, the addition being:

R. + 1 D. sph.
L. + 1 D. sph.

with the effect of quickly, entirely and permanently relieving the dizziness while the glasses are worn. It can be readily brought back by leaving them off.

The following case is exceedingly interesting in showing the wide range of nervous sensations having an eye-strain as their origin:

Case of Mrs. H., Rochester, N. Y. Aet. 53. For nearly a year past had suffered with pain in the left ear. Sometimes the sensation was one of burning with a feeling as of wind in the ear. Ear gets very dry and awakes her from her sleep. Has for a number of months been under the care of an otologist, and had the ear treated and the Eustachian tube inflated. Conscious of a swaying feeling in a crowd. Cannot go alone into a store to shop. Has had intense and continued neuralgia in the left foot in the region of the instep. Sensation of weakness in the ankle as though it required a support, but the pain was so intense that she could not wear one. Had twitching of the left eyelid. Tendency to insomnia. When once awake cannot sleep for the rest of the night. Cannot walk alone in the street because of unwarranted sensation of fear.

She was wearing glasses irregularly, which had been very carelessly chosen. Her refractive test showed:

R. + 1.12 D. sph. + .25 D. cyl. ax. 120 v-20/20
L. + 1.12 D. sph. + .50 D. cyl. ax. 30 v-20/20
Add O. U. + 2.25 D. sph.
Jaeger—1.
Esophoria—3°.

She was given full correction with bifocal glasses for constant use. On May 14th, the occasion of her second visit, she reported marked improvement in all of her nervous symptoms. The pain in her foot and other sensations of discomfort have wholly disappeared, and her nerves were under better control. On September 4, the occasion of her third visit, she had suffered a nervous shock in the instantaneous death of a brother, who had seemingly been in perfect health, but there was no return of any of the symptoms involving the head, face, or foot. She has not attempted to go without her glasses, feeling quite unable to do so without a return of the nervous condition from which she had previously suffered.

The following is perhaps one of the most typical cases that has come under my observation, and the case history was written in a subsequent letter by the patient's wife, he himself being a physician:

Record W. H. D. Physician. Aet. 41. Habits strictly temperate.

For 18 years had had severe headaches with nausea and vomiting, apparently caused by fatigue and frequently accompanied by feeling of faintness. About 12 years ago noticed roaring and deafness in right ear. Ear treated by specialist for short time. Used left ear for diagnostic purposes entirely. About 10 years ago pupil of the left eye became dilated and there was twitching of the eyelids. Consulted ophthalmologist, who said there was some third nerve trouble, and prescribed:

O. U. + .50 D. cyl. ax. 180

In October, 1905, was taken suddenly with vertigo on the street. Was very much confused and bewildered for about ten minutes. Again in October was taken with vertigo in his office and would have fallen but had assistance. Was apparently unconscious for over an hour. Realized something of what was passing, but was unable to signify any consciousness. This was accompanied with an attack of nystagmus. Sensation, that of "being caught up in a whirlwind." During another attack in August, 1907, was obliged to lie down on floor to prevent a fall. This was followed by nausea and vomiting, and the next day by pain in the head and nausea. Always before these atacks felt unusually well. Between attacks up to January, 1908, suffered with sick headaches every few weeks. Was taken again with vertigo on the 18th of January and for the three weeks following had from three to four attacks in twenty-four hours, sometimes accompanied with nausea. Was confined to bed and would have attacks during sleep, especially if lying on back or right side. When awakened by vertigo—usually between two and three A. M.—would lie awake until daylight for fear of recurrence of attack. On January 23d fell as he was being seated in street-car. That time fell to the right, but at other times was unable to tell in which direction he did fall. Could find no one thing that would always bring on an attack. An attack sometimes followed a quick turning of the head, bending over, looking up quickly, and sometimes occurred during a meal, about an hour after eating or from the motion of the cars or carriage. At other times there would be no vertigo under apparently the same circumstances. Pulse during an attack was from 48 to 58 while normal rate was from 60 to 66. After January 18th sick headaches disappeared, followed by fullness and pressure at base of the brain. Circulation very poor. Hands and feet cold much of the time, particularly at night. While confined to his bed during severe atack voided large quantity of light-colored urine, which, on examination, showed an immense amount of solids and at times a trace of indican. Had troubled sleep with feeling of weakness in morning. Breath offensive. Felt better when he had breakfast in bed, and twice when he dressed before eating had attacks of vertigo about an hour afterward. Seemed to feel better in the afternoon than in the morning. From February 3d to March 11th had no return of the vertigo and felt pretty well except for the pressure and fullness in the head, which was always present.

On March 11th taken suddenly with vertigo. Symptoms same as before with exception of one day's continued nausea and vomiting, which was more severe than ever before. Continued having attacks of vertigo every day until on the 28th of March, while in conversation with a man, without warning of dizziness or nausea, fell to the floor. Fell to the right and the attack continued with more or less severity for about an hour. On March 29th came for an examination and gained relief from the pressure at base of brain through the use of the homatropin. The examination showed the eye-ground to be perfectly normal. The homatropin test gave the following equation:

R. + 0.25 D. sph. + .87 D. cyl. ax. 15 v-20/20
L. + 0.25 D. sph. + .75 D. cyl. ax. 165 v-20/20

He had ten degrees of exophoria at proximal range. He was given an over-correction of one dioptre to wear constantly because of a belief that the homatropin correction was not as complete as it should be, as it is frequently found that the employment of a process of fogging will bring out results not obtained under cycloplegic. On the 9th of April was feeling so well that he wrote continuously for two hours on an address for a medical society. In the evening complained of pressure in the back of his head and was unable to finish writing. About three o'clock next morning awoke with severe headache, which continued throughout the day and prevented any further writing or attention to office work. Eleven o'clock of the morning of the 9th vomited and was dizzy for the rest of the morning. This was the first time his accommodation had been taxed to any extent. From this time the condition constantly improved. On April 19th the refraction showed:

R. + .37 D. sph. + .87 D. cyl. ax. 15 v-20/20
L. + .62 D. sph. + .87 D. cyl. ax. 165 v-20/20

In July a letter reported some return of the vertigo "with a less degree of severity, but quite often." An examination made by a most careful internist, including blood count, urinary analysis, etc., was negative and the diagnosis was intestinal toxemia produced by eye-strain. It was evident that the bottom of the case had not been reached. By July 30 he was able to take + 0.62 D. sph. on each eye with the same cylinders, and this he was given with a + 1. D. sph. additional in the form of a bifocal correction.

The last letter reported an entire freedom from vertigo, and a general feeling of well-being such as he had not experienced since he had been ill. He had during this time taken Holadin for the intestinal condition, but the slightest over-effort on the part of the eyes or the disuse of the glasses would readily cause a recurrence of the former symptoms. On September 3d he still reported no return of the vertigo.

The report of his ear test on September 3d, 1908, was as follows:

LEFT EAR—
Normal.

RIGHT EAR—
Whisper—at three feet.
Watch—one inch, better on contact with external meatus than on mastoid.
Gelle—neither positive nor negative.
Weber—no.
Shrapnell—slightly relaxed.
Tinnitus—roaring, like running water in distance.
Duration—12 to 14 years.

		Negative	Equal	Positive	Positive	Positive
	A. C.	38 0	19 6	65 25	31 13	20 6
Schwabach	B. C.	16 5	8 4	24 8	13 6	13 0
	T. F.	C	C_1	C_2	C_3	C_4

Rinne—with fork C, air conduction, feels the vibration, but does not hear it. C_2 and C_3 bone conduction very faint.

Nose—inf. turb. engorged at times.

Tubes—open.

We have in this case an almost typical symptom complex such as has been commonly associated with pathologic labyrinthine changes and this case had indeed been diagnosticated by careful observers as Meniere's disease, but he was of an age when presbyopia had begun to be manifest, he obtained immediate though temporary relief from a cycloplegic, his refractive anomaly had not been fully corrected and he has gradually but certainly recovered under the relief of his eye-strain

When, as not infrequently happens, with vertigo there is a more or less persistent ringing or roaring or fluttering in the ears on one or both sides with some impairment of hearing, and associated with nausea, we have all of the elements that were described by Meniere as a labyrinthian involvement, except the sudden and complete loss of hearing, and as there has been much doubt concerning the few cases in which labyrinthine changes have been verified by postmortem examination. I am led to inquire, may it not be that after we have eliminated that rare condition of labyrinthine hemorrhage, together with those cases of known aural origin, those having a syphilitic basis and those dependent upon a basilar neoplasm, that with our later and more exact clinical knowledge of the etiological relationship of eye-strain and vertigo, and our more complete studies of the finer neural anatomy, we may not be obliged to reverse our conclusions and consider that there may be a symptom complex which we have heretofore supposed to be labyrinthine, but in which the eyes, and not the ears give rise to the pathologic disturbances.

The warrant for such an apparently bold departure from established teachings will seem to be justified when the facts are carefully taken into consideration. These facts are first clinical, second anatomical, and third pathological. Says Politzer, "Although since Meniere's publication, apoplectiform deafness, accompanied by characteristic symptoms, as described by him, has often been clinically observed and described by aural surgeons, there is still doubt as to the correctness of strictly localizing the above combination of symptoms in the labyrinth." He quotes the traumatic case of Moos with hemorrhage into the periosteum of the internal cavity of the whole membraneous labyrinth in which neither subjective noises nor giddiness were present, and that of Lucae, in which they were also lacking in a hemorrhagic inflammation of the labyrinth occurring in the course of a tubercular basilar meningitis. "In recent times," continues Politzer, "all subjective disturbances of hearing associated with noises and giddiness have been called Meniere's Disease or Meniere's complex of symptoms, disturbances of hearing which, as we have seen, are also frequently observed in accumulations of cerumen, vegetations in the external meatus, in affections of the middle ear, in many temporary congestions of the labyrinth or brain, after injuries or tumors of the brain," and he notes particularly that all of the Meniere symptoms were present in Wolf's case of tumor of the amygdala of the cerebellum. Knapp observed, after an attack, dimness of vision, and Moos transitory hemiopia with horizontal line of separation. These, together with our more recent observations, would incline us to the belief that the real source of this group of classic symptoms is not the labyrinth, but that any irritation carried to the mid brain, from pressure, a reflex, or from what source it may come, will produce vertigo, nausea, ringing in the ears, or deafness, and one other symptom that is pathognomonic of cerebellar disturbance, marked and ungovernable weakness of the legs.

As long ago as 1881, Dr. George T. Stevens, in a remarkable, though brief paper, read before the International

Medical Congress of that year, entitled, "*On Certain Conditions of the Eyes as a Cause of Loss of Hearing by Reflex Irritation,*" enunciated some principles, and cited instances that at least established a basis for future study in this important, but hitherto unknown, field of research. He quotes the law that the same peripheric cause of irritation acting on the same centripetal nerve may produce the greatest variety of effects, including every functional nervous affection or disorder. "My own observation and experience," he said, "lead me to believe that reflex irritations affecting the sensations and nutrition of the ears are not of unfrequent occurrence, and indeed they are much more common than would be supposed from the fact that so little atention, if any, has been bestowed upon them." This case being the first reported, and of some interest, is summarized here:

> "A lady of forty-two was tormented by subjective sounds, and her hearing was reduced one-half. The ears when examined gave no indications of disease. Inflations with Politzer's bag gave no relief, general tonics, electricity, bromides, a change of air, all failed to modify in any degree the tormenting noises which destroyed sleep, added to the general nervous irritability of the patient, and made her miserable. There was slight insufficiency of the external recti muscles, and there were pains in the temples and brows. After three months of fruitless attempts to relieve the patient by such measures as have been mentioned, a partial tenotomy of one of the internal recti muscles was made. In a very few days the roarings and hissings ceased, the hearing returned to the normal standard, and the lady was greatly improved in her general nervous condition. In this instance it is as certain as anything in medicine that the relief not only followed, but was the legitimate result of the greater freedom of the eyes, which, up to the time of the slight operation, had been kept constantly on the alert to maintain monocular vision."

The discussion which followed had no relation to the subject of the essayist's paper whatever.

In 1895, Dr. Arthur A. Boyer, in a paper entitled "*The Relative Importance of Labyrinthine and Ocular Defects in the Etiology of Vertigo,*" and read before the Neurological Section of the Academy of Medicine, New York, after reviewing the subject elaborately, cited ten cases in which vertigo and lowered hearing were associated with refractive errors or muscular imbalance and which disappeared on the re-establishment of ocular sufficiency. It was not until the meeting of May, 1907, that this unusual subject seems to have received further attention, when Dr. Marcel Rollet, of Blois, in a profoundly interesting and valuable paper, read before the Societe Francaise d'Oto-rhino-laryngologie and published in the *Revue Hebdomadaire* for December last, presented further new observations and completely reviewed the entire subject in a paper entitled "*de l'Influence de l'Oeil sur l'Oreille a l'etat normal et pathologique*," and adds to the observation already made. He arrives at the conclusion "that there exists between the organs of vision and those of audition certain relations—both direct and indirect—relations which the nervous connections both central and peripheric of the two organs suffice to explain, and it must be admitted that in the case of objects which may be recognized by the two organs the excitation of the one of them may awaken through the association fibers the images of the memory belonging to the other organ.

That this conclusion is justified is shown in the relationship of the two branches of the auditory nerve with the motor nerves of the eye and the cerebellum. As Edinger has shown, "the roots of the abducens arrive by several extended bundles, which pass through the tegmentum and the pons at the base of the pons externally. On the median side the nucleus is connected with the posterior longitudinal bundle. It is claimed, though not well proved, that these fibers enter the opposite motor-oculi nerve. Without doubt, however, there is a remarkable connection between the abducens nucleus and the superior olive. *This connecting tract must place the acusticus in connection with the motor nerves to the eyes and is perhaps of importance for the maintenance of position in space.*" "The upper olives," continues Edinger, "interposed as they are in the central nerve fibers, must be centers of importance—their constant occurrence through the entire list of mammals—their frequently large development, and above all the wealth of fibers entering into relation with them, are evidence of this. Among these fibers from the cerebellum, still but little understood, is a large strand from the center of the nervus abducens. Since in this center of the sixth nerve, however, fibers end, which pass through the fasciculus longitudinalis posterior to the centers of the other motor nerves of the eye and to the thalamus, there is here apparently a well organized synergetic apparatus well deserving further experimental research."

The way to find out the function of an organ is to observe its actions under known conditions of stimulation. The cerebellum is so deeply situated and inaccessible because of vulnerable organs around it that coarse attempts at vivisection are unsatisfactory and untrustworthy. There are conditions, however, in which a known irritation has been excited by pressure, as in the case of cerebellar neoplasms in which certain symptoms are definite and unvarying. These symptoms can arise only from an irritation because where the pressure has become sufficiently great to abolish the function of the cerebellar tissues the irritative manifestations cease and death ensues. "A close functional relationship," says Lodholz, "has been found to exist between the semicircular canals and the cerebellum," and it is not without importance that the muscular exhaustion that is so frequent a symptom of eye-strain finds its extreme manifestation in the cerebellar pressure due to a neoplasm.

Perhaps the most uniformly common symptom of neoplastic involvement of the cerebellum is *pain,* which is over the occiput and back of the neck. Aside, then, from choked disk, which may arise from any intracranial pressure, *nystagmus* is one of the most frequent symptoms of cerebellar growths.[1] The movements in nystagmus may be horizontal or vertical or both at the same time, indicating an incoordination of all of the straight ocular muscles. Subjective vertigo is usually present. It is associated with nausea. The most characteristic symptom, however, is asthenia. In all five cases reported by Granger Stewart,[2] the patient's exhaustion of an eye-strain manifests itself in weakness of the calves of the legs. In a most excellent and recent review of our present knowledge of the Meniere symptoms complex, Goodhart says, "As the violence of the seizure abates and the symptoms subside, incoordination and ataxia of the lower limbs become evident. Indeed, the Romberg symptom and varying degrees of ataxia are commonly present as permanent symptoms, and are valuable diagnostic factors in the interparoxysmal periods. The ocular symptoms—nystagmus, diplopia, narrowing of the visual fields, subjective sensations, zig-zag figures, etc.—show that we are dealing with the same brain area in the Meniere triad as that which has to do with the perceptive and motor functions of the eyes." "Indeed," says Goodhart, "closing the eyes, fixing upon a near object, tightly closing the lids or compressing the eyeballs sometimes favorably influences the vertigo."

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[1] Symposium entitled "Tumors of the Cerebellum"—Charles K. Mills.

[2] Edinborough Hospital Reports, 1898.

Stephani's experiments, in which the Perkinje's cerebellar cells degenerated after the removal of the semicircular canals, justified the view that the canals are the peripheral organ and the cerebellum is the center. From this center all the cerebral motor functions are controlled. It is the governor by which, through the visual, auditory and other sense organs, we maintain our position in space. It influences and is influenced by disturbances originating in the eyes, probably in other peripheral sensory structures, and is as essential in the act of binocular vision as is the cortex of the cuneus, the quadrigeminal bodies, the retina or any other part concerned in the visual act.

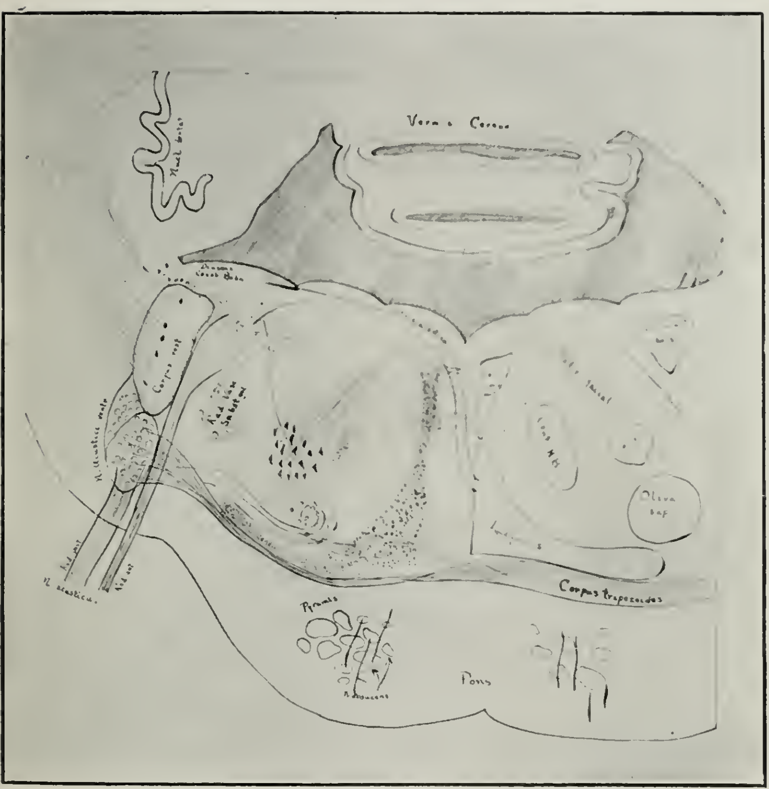
Waetzold's observation has a bearing in this connection. "Out of one thousand young girls studying the piano before the age of twelve years," he says, "six hundred were afflicted with nervous troubles later on, while the number having affections of this kind was only two hundred for those who commenced the study at a later age, and only one hundred were affected among those who never touched the instrument." It would be interesting to know what exactly these nervous manifestations were and whether incoordinated movements accompanied them. It is quite conceivable that the endeavor to associate the complicated muscular movements of untrained fingers with the still more difficult task of distinguishing between tones and half-tones and combinations of chords by undeveloped neurons in the child's brain cortex and at the same time following with eyes that may not be focally alike the notes on the staff, would disrupt the delicate mechanism of the developing brain tissues, but it demonstrates, also, that it is in the intricate anatomical switchboard that all of those automatic connections are made, and it is easy to realize, if we think of physiologic processes in the terms of electricity, how readily a connection that is made of poor material, from bad heredity or poor nutrition, or that is subject to too much current from overwork or uncorrected eye-strain, may result in a burned-out fuse and a shortened circuit, and the energy is then carried through another wire producing a disturbance where there should be none.

It is now a recognized fact that visual anomalies, especially those involving the ocular muscles, can produce vertigo and nausea. If we add to these tinnitus, or fluttering in the ears, with a new symptom which has been considered a direct result of deficient visual neuricity, that of ataxia, especially involving the calves of the legs, we have a group of symptoms due to abnormal conditions of the eyes which almost exactly resembles an allied group which we know to be dependent upon a definite cerebellar pathology. Are we not justified, therefore, in concluding that the cerebellum is at least an important element in correlating or coordinating the motor functions which obtain in binocular vision? At least when the so-called Meniere triad presents in practice with an obscure pathology it will be in the interest of scientific precision if the refraction and muscular values constitute a part of each case record in every instance.

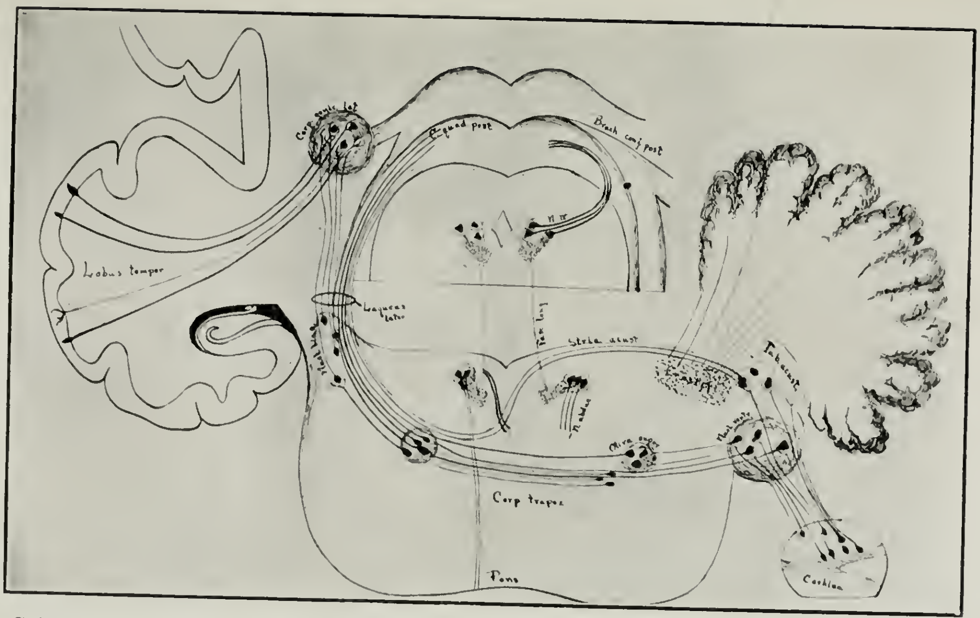
Dubois has said that rare diseases become often astonishingly frequent when a correct diagnosis has been made. I think that it will be shown that when, in examining eyes, we become habituated to looking for cerebellar and auditory relationships, we will be astonished to find how commonly they will be found to exist, and an understanding of the cerebellar influence in coordinating the movements of the eye muscles in the act of binocular vision may prove to be an important and hitherto neglected factor in our study of the physiology of sight.

151 Franklin Street.

Note.—The April number will contain a translation of Dr. Marcel Rollet's article upon "The Influence of the Eye On the Ear Under Normal and Pathological Conditions," by Dr. Lewis.



The acoustic roots and their relationships.
(After Edinger.)



Schema showing relationship of the two roots of the auditory with the cerebellum and 4th. The fasciculus long. also reaches to the 3d and is lost in the cord. (After Edinger.)

BEGINNING SIGNS OF RETINAL ANGIOSCLEROSIS.*

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Obstructive disease in the retinal vessels has come in for a great deal of discussion in recent years. Improved laboratory work and clinical methods in the study of the circulation have given a decided stimulus to the study of the circulation in the retina. Too, the efforts of the laboratory worker, the internist and the ophthalmologist, are being correlated as they never have been before, and ere long we shall have some definite facts on which to base statements as to the various stages of ocular angiosclerosis.

These various stages of change in the retinal vessels have offered a basis for numerous classifications. Gunn's and Frost's are well known. They refer especially to well marked changes in which degenerations play no small part, although it must be said that Gunn, by his insistence on the recognition of the displacement phenomenon, has focussed attention on one of the earliest warning signs. Loring's description of vessel wall changes in the first volume of his work on the ophthalmoscope (1891) is a very forceful summing up of the conditions underlying early changes. In 1904 Greenwood urged "that the importance of retinal angiosclerosis is not ordinarily recognized, that indeed it is often overlooked; or if observed, only given a passing thought unless of a degree sufficient to cause grave lesions in the retina, and then looked on as a progressive condition that treatment will not stay nor alter."

Necessarily, much turns on the interpretation of the findings with the ophthalmoscope, but it would seem that the time has come when there should be some agreement as to what constitute beginning signs—and what well marked signs of advancing change in the ocular circulation. In this paper we shall deal only with the beginning signs of such changes.

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*Presented to the Medical Society of the State of Pennsylvania September 15, 1908, at Cambridge Springs, Pa.

About the same time that Greenwood's contribution appeared, Alleman brought forward his report on "The retinal symptoms of vascular degeneration in 40 cases, in all of which careful urinalyses had been made." His classification offers four groups, in the first two of which there is no organic lesion discoverable, the main findings being tortuosity of the smaller retinal vessels and their terminal twigs, and more or less bending of the vessels at the crossings. In the other two groups there is evidence of organic change with the vascular, hemorrhagic and degenerative phenomena with which we are all familiar. Two years ago de Schweinitz (Concerning the signs in the retina of persistent high arterial tension and their diagnostic and prognostic import, *Trans. Amer. Ophthal. Soc.*, Vol. XI.) observed that the eye-ground lesions of persistent high arterial tension may be conveniently divided into those which are *suggestive* and those which are *pathognomonic.*

As suggestive signs, he enumerates uneven calibre and undue tortuosity of the retinal arteries, increased distinctness of the central light streak, an unusually light color of the breadth of the artery, and alterations in the course and calibre of the veins.

As pathognomonic signs, he gives changes in the size and breadth of the retinal arteries, producing beading; distinct loss of translucency; marked lesions in the arterial walls, such as the white stripes of perivasculitis; and lastly —and most important—indentation of the veins by the stiffened arteries. A comparison of Alleman's and de Schweinitz's classifications, shows that Alleman's first two groups conform largely to de Schweinitz's "suggestive" signs, while Alleman's last two groups practically include all the signs put down by de Schweinitz as "pathognomonic."

Age is no longer the dominating element in these phenomena that it was once thought to be. In Alleman's 40 cases, 15 were 30 years of age and under. In three of his very young cases—one of 20 and two of 13—the signs of sclerosis in the retinal circulation were marked. At the 1906 meeting of the American Academy of Ophthalmology and Otolaryngology, the writer reported two cases of beginning disease in the retinal vessels—one in a 35-year-old, and one in a 29-year-old, woman. In the latter case the urinalysis showed a mere trace of albumin, some indican, urea only 55 per cent. of normal. So that it is no longer a question of age in these cases, but one of life habits, metabolism and the condition of the general arterial tension.

THE BEGINNING SIGNS AND THEIR VALUE.

De Schweinitz lays great stress on the three following signs:

1. A markedly corkscrew appearance of certain arterial twigs, either of those which skirt the macula, or more significantly of one or more small branches of one of the larger vessels.
2. *Flattening* of a vein where it crosses or is crossed by an artery, a phenomenon that is likely to appear first in the inferior vessels.
3. A peculiar dull red appearance of the nerve head, unlike that of eye-strain irritation or incipient optic neuritis.

As to the first sign, the writer has a feeling that it is perhaps the very earliest sign of the retinal angiosclerosis. This is also the sentiment of Alleman, who pictures it in his contribution to this subject (*Amer. Med.*, Vol. VII, p. 304). Cases exhibiting this anomaly constitute his Group 1.

As to the second sign of de Schweinitz, namely, flattening of the vein, it may be said to be one of the most frequently sought after by most ophthalmic surgeons. This is because no mydriatic is needed for the study of the phenomenon, whereas some mydriatic is almost always required in the search for twisted vascular twigs. Alleman alludes to the sign as bending of the vessels at the crossings, and constitutes it his Group 2. Gunn, some years ago, was perhaps the first to describe it as the "displacement" sign in incipient cases.

As to the third sign of de Schweinitz—the dull red nerve head—the writer finds it very hard to determine in his own mind whether to place it among the beginning or the established signs. In the cases in which he has had opportunity to study it, it has been almost always associated with marked pressure signs at the crossings, and these latter are by general agreement accepted as established or pathognomonic signs. It is with extreme hesitancy that he takes this stand, but this is his present state of mind.

There are two extra-retinal signs often associated with ocular angiosclerosis to which attention should be directed. The first is sluggishness of pupillary reaction, and the second, abnormal recession of the near point (or failure of accommodation), sometimes of unequal degree, in the two eyes. When the pupillary reactions are tested in the dark room, with the ophthalmoscopic mirror, the behavior of the pupil can frequently be studied to much better purpose than in full daylight, when, because of a flood of light, the third nerve *almost entirely* dominates the iridic movements. In cases of ocular angiosclerosis, the iris, because it is a vascular membrane, is very likely to partake in the sclerotic process, and reveal this fact by a retardation of the normally quick response to light stimulation. Indeed, the writer is inclined to believe that sluggishness in pupillary response will come to be recognized as one of the correlated signs of angiosclerosis.

The ciliary body, too, is almost totally vascular in its make-up, and should the eye be the seat of the angiosclerotic process, it is not unthinkable that this process should find expression in more than usual reduction of the power of accommodation. So that this, too, may become in time a recognized clinical sign of angiosclerosis. While what has been said of these two extra-retinal signs of ocular angiosclerosis is purely speculative, it is submitted for what it may be worth.

As to the value of the foregoing retinal signs, much depends, of course, on the interpretation of the findings with the ophthalmoscope. But internists themselves are looking to us for help in just this class of cases.

Stengel (*Proceed. Phila. Co. Med. Soc.*, 1905) recognized three clinical stages of angiosclerosis, to wit:

1. A preliminary one, difficult of recognition in its beginnings, and confusing to the clinician in his efforts to distinguish the part of the etiologic factors from that of the arterial disease in the symptom complex.

2. A middle period during which the arterial disease is easy to recognize, but in which secondary organic changes have a role of variable importance.

3. A final stage of failure of circulative organic and terminal infections.

It is in Stengel's first or preliminary stage when the clinician may find himself confused, that the beginning signs of retinal angiosclerosis ought to be most carefully sought for. Stengel himself has said (*Penna. Med. Jour.*, Aug., 1904) "that the ophthalmoscope may reveal the positive evidence of vascular disease before general angiosclerosis has become marked." Hence the necessity of the most careful ophthalmic study in all cases of suspected beginning general angiosclerosis. Much work must needs be done in the field before positive final statements can be made. The internist, the ophthalmologist and the laboratory worker must combine their efforts in a large number of cases, and reports must come from many sources, to bring about this result.

Stengel points out the difficulties in the following words: "If the few symptoms I have named (pulse condition, character of heart sounds—increased tidal wave on the sphygmogram—and elevation of tension as recorded by the sphygmomanometer) were found in arteriosclerosis alone, the diagnosis would be greatly simplified, but this is not the case." And just here de Schweinitz makes the point that "the ophthalmoscopic signs that have been detailed are produced by no other condition except angiosclerosis," and that, therefore, examination of the eye-ground should never be omitted in such cases. There is need, too, of course, of the most searching urinalyses, blood examinations, and especially coagulability tests in a large series of cases, to determine what may be the relation of these beginning signs to the development of general angiosclerosis. Jackson, in the discussion of Lamb's paper (before the 1907 meeting of the American Academy of Ophthalmology and Oto-Laryngology), warns against jumping to the conclusion that because signs of angiosclerosis of a retinal vessel are found, generalized sclerosis must necessarily obtain. He aptly says, "If we find a certain vessel decidedly affected, there is a possibility that others are affected. But it is commonly much more advanced in some vessels than others. Too, it is possible to have it quite advanced in the eye without serious changes in the other vessel areas."

But such findings in the eye should stimulate the internist to the closest scrutiny of the patient from every possible standpoint. The following case is in point:

Mrs. M. S., aged 45, came to the writer June 12, 1908, to see whether glasses would be of any benefit to her. She had suffered a severe mental shock five years previously. The main symptom in her case was almost continual vertigo, varying in degree. For six years prior to this time she had suffered from vertigo. There was very little headache. At times in the severe vertiginous spells she would momentarily lose consciousness. Occasionally the vertigo would be nocturnal. The patient was a medium height woman, of healthy appearance, full habit and volatile temperament. Her vision was 5/12 in each eye, the eyes were normal anteriorly, ocular movements smoothly and completely executed, no diplopia, visual fields normal. The folowing correction—

R. plus 0.50 sphere, plus 0.75 cylinder, axis 135 degrees.

L. plus 0.75 cylinder, axis 45 degrees.

This gave her vision of 5/6 poorly in each eye. The ophthalmoscope revealed a nerve head of rather poor outline, arteries with a very bright light streak, veins much indented at crossings, and showing the thickened arterial walls and narrowed blood columns at these points. No hemorrhages, edematous areas, nor transudations. The patient was referred to Dr. G. Morton Illman, who reported as follows:

"Urine reveals no albumin nor sugar—positive indican—no urobilin nor bile—urea 2.6 per cent—some calcium oxalate. The blood pressure was systolic 120—diastolic 90—the blood coagulation time 7 minutes, 30 seconds. One week later under treatment blood coagulation time 6 minutes." He then went on to say: "Mrs. S.'s condition is probably some manner of autotoxemia. The presence of toxins in the blood ofttimes influences its coagulation time to a considerable extent, and also irritates the delicate endothelium of the intima. The great majority of the intoxications and the diseases accompanied by a marked intoxication, have a tendency to prolong the clotting time of the blood. This has been my experience in a number of such cases of arteriosclerosis, toxic in nature."

As to the prognosis, as affected by the discovery of beginning retinal angiosclerosis—nothing could be more to the point than the two case histories with which de Schweinitz closes his paper before the American Ophthalmological Society. One of them, a woman of 58, with corrected vision of 6/5 and only beginning signs of retinal angiosclerosis, who two months later exhibited large hemorrhages in the lower portion of the eye-ground. The other, a school principal of 48, with normal corrected vision, and only barely beginning signs of retinal angiosclerosis, who two weeks after the ophthalmoscopic examination died in bed of apoplexy.

Finally a few words as to treatment. In addition to all the accepted medicinal and non-medicinal measures, the writer believes pilocarpin—both internally in small doses for its lymphogogue effect—and hypodermically for its diaphoretic effect—to be the most potent remedy in all cases whose nature suggests in any way a toxic origin. This is intended purely as an adjunct to all recognized methods of treatment.

In conclusion the writer may brief his ideas as follows:

1. Of the three important end organs, the brain, the kidney and the eye, the latter is the only one that affords opportunity of study of such a circulation at first hand.
2. Beginning disease of the retinal vessels is all too frequently overlooked or its import disregarded.
3. The most thoroughgoing conjoint work on the part of the internist, the ophthalmologist and the laboratory worker is needed for the solution of this question.
4. It is altogether probable that the behavior of the pupil is more or less related to ocular angiosclerosis.
5. It is also probable that abnormal accommodation failure of unequal degree may be related to vascular disease.
6. The findings with the ophthalmoscope should be added as a fifth index of angiosclerosis (as urged by de Schweinitz) to the four enumerated by Stengel.
7. The prognostic value of such findings is as yet not sufficiently worked out.

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GROSS OBSTRUCTIVE VASCULAR DISEASE IN THE RETINA.*

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Many persons who are afflicted with minor disturbances of the retinal vessels do not come under the observation of the ophthalmologist; and when they do, it is difficult to convince any great number of them that their condition is worthy of constant precautionary measures. These minor changes usually do not greatly affect vision, and the seriousness of the situation is not apparent to the patient.

While it is true that marked vascular changes short of actual obstruction may be associated with good vision, and ensuing long life, it is the exception, and does not prove that precaution is unnecessary.

In a certain proportion of these cases, however, there comes a time when the oculist is quickly sought and his advice is followed to the letter. This is when spasm, or obstruction in the lumen of some important vessel has occurred, and the prospects from treatment are not promising.

We naturally see more of these cases in middle and later life, but their occurrence in young people is not rare. In one of my cases the age was sixteen years. Different records show a remarkable variance in the frequency of these lesions. At the University of Zurich, and in Prof. Haab's private practice, the frequency of so-called embolism of the central retinal artery was 1 in 4,500 cases. Zagkin, at the St. Petersburg Eye Institute, found it to be 1 in 22,500 cases. In Schoebl's practice it was 1 in 5,000 cases. In my own more limited experience it has been 1 in 500 cases. Whether a more extended observation will show a less proportion I cannot say.

As a whole, the eye has a very plentiful blood supply.

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*Read at the meeting of the Medical Society of the State of Pennsylvania, Cambridge Springs, September 14, 1908.

In general it is supplied by branches of the internal carotid supplemented by anastomoses with branches of the external carotid. In addition to this it may receive blood from the vertebral artery through the circle of Willis; and also from the opposite side of the base of the brain. The vessels of the globe proper are the long, short, and anterior ciliary arteries, and the central artery of the retina. The central artery of the retina divides into the superior and inferior branch which further divide into temporal and nasal branches. These have corresponding veins. This constitutes the entire retinal supply except in those cases where a ciliary branch through the circle of Zinn may enter the retina. These usually have no accompanying veins.

Compared with other structures of the eye, the retina is sparsely furnished with entrances and exits for blood. Congestion in other parts of the eye, a rigid sclerotic coat, or pressure upon the eyeball will greatly impede the retinal circulation. After an obstruction of the artery, an effective collateral circulation cannot be maintained unless it is in the central region by means of a cilio-retinal vessel. Hay reports such a case, and Zentmayer observed obstruction in a cilio-retinal artery. Krauss had a similar case where function was restored by collateral retinal circulation Grifenberg reports two cases of embolism of the central retinal artery where central vision was preserved by an invisible arterial supply. Occlusion of a branch artery may not materially affect central vision, unless, as sometimes happens, the macular region has been supplied almost exclusively from that area of distribution.

In a general sense, it may be said that certain conditions of the blood substances, the vascular coats, the vascular tension, or the blood current may cause obstruction. The exciting causes are emboli, thrombi, endarteritis, endophlebitis, arterial spasm, and—rarely—hemorrhage into the sheath of the optic nerve. The one great contributing cause is local or general angiosclerosis. Others are syphilis, pyemia, valvular heart disease, nephritis, chorea, autotoxemia, and the toxic effects of drugs and chemicals, such as tobacco, lead, quinine, phosphorus, etc. Clinically, we recognize the following obstructive conditions: Embolism, thrombosis, and spasm of the arterial trunk or its branches; and thrombosis of the venous trunk or its branches.

While true emboli do occur, it has been histologically shown by Coats that clinically typical cases of embolism of the central artery were thrombosis, obliterative endarteritis, or both. An apparent venous thrombosis often proves to be an endophlebitis with or without thrombus. In a few cases the microscope has shown no obstruction at all, which may be explained by acquired permeability, persistent arterial spasm sufficient to cause loss of function, or to imperfect technic.

Pathologic data are limited, owing to the difficulty of obtaining such affected eyes for laboratory investigation. Some are procured long after the primary attack, or following secondary glaucoma and are therefore apt to give uncertain findings. When the central vessel is involved, the lesion is usually situated in the lamina cribrosa or just behind it. After examining a fairly large number of eyes in which the central vein was affected, Coats cites the following changes found in the vessels: 1. Endothelial proliferation. 2. Connective tissue thickening of the walls. 3. Hyalin degeneration. 4. Secondary thrombosis and its combinations. Verhoeff examined six eyes in which the diagnosis of thrombosis of the central vein had been made. He found a true thrombus in two cases, and these were septic in character. In the other four, endoplebitis proliferans was the causal factor.

Coats observes that it is not plain why stoppage in the arterial side of the circulation should cause venous impediment and copious hemorrhages. He also states that thrombosis of the central vein may occur in young subjects whose urine usually shows no albumin, but who have some illness, such as grippe or cold with fever. The microscope in these cases showed inflammatory changes, while in older subjects endarteritis was the rule.

In vascular disease of the eye, one may expect, and usually finds, it to be a part of a general process, but this is not always the case, as it has frequently been found as a primary condition—a localized angiosclerosis.

Final obstruction of either arteries or veins is often preceded for some weeks or months by minor disturbances of vision which may last a few minutes or longer. A sensation of sparks before the eye is not an uncommon symptom. In arterial stoppage, a flickering may usher in the final attack. Four of my cases were affected during sleep. One had slight pain the others were not awakened. Vision soon becomes practically nil if a trunk is involved, and partially so if a branch is occluded. If seen early, the ophthalmoscope shows the disk to be quite pallid and edematous, as is the adjacent retina, especially toward the macula.- This edematous condition usually obscures parts of the vessels in this region. About the macula one observes a greenish pallor, which is less pronounced toward the periphery. At the site of the macula itself is a cherry-red spot, which appears darker in the dark-skinned person. The arteries are very thin and pale, and the light streaks are faint. The veins are broader than the arteries, especially at the periphery, and become quite narrow on the disk. They are dark, with little reflex, the small ones often being tortuous. Hemorrhages, if any, are noted later, or when a branch artery is affected. After a varying period of time the arteries become better filled or may atrophy. The retina regains much of its usual appearance, and the cherry-red spot disappears. Vision improves little, if any, but is better in the temporal field.

In occlusion of a branch artery, the foregoing phenomena are observed in its area of distribution, but I have noticed that the entire fundus is more or less involved, without, however, the cherry-red macular spot.

In obstruction of the central vein, vision is not so markedly affected, nor are prodromes so frequent. The visual disturbance is apt to be gradual in onset. The ophthalmoscope shows a blurred optic disk on which hemorrhages may be seen. Numerous retinal hemorrhages are the rule and may include the macula. The veins are turgid, dark and tortuous. The arteries are thin and pale. The worst cases result in abolition of vision, secondary glaucoma being a not infrequent sequel. If a branch is occluded the situation is much the same, except that the entire fundus is not involved.

Lundie, Wagenmann, Noyes, Loring and Harbridge have reported instances of arterial spasm which, though lasting for varying periods, and giving the usual symptoms of obstruction, finally relaxed with ensuing good vision. This same contraction is observed in epilepsy, migraine, malaria, and quinine poisoning. I am inclined to believe that autointoxication may also produce it. Benson and Raymond have seen cases where a branch artery was affected by spasm. The visual fields will vary according to the degree and area in which the retina is affected. In central cases they are uncertain and often impossible to obtain. In my patients, where the central artery had been occluded, the vision was much better in the temporal fields than in the center.

On the whole, treatment has been very unsatisfactory. Nitrite of amyl or nitroglycerin are usually given to increase the lumen of the affected vessels, and potassium iodide for its absorbing powers. If seen early, forcible circular massage under cocaine anesthesia is occasionally successful. Wood, White, Mules, Hirschberg, Hilbert, Fischer and Gifford have reported recoveries under this method. In 1906 Fejer reported one case where fair vision was gotten; in 1907 another, where normal vision was attained in eight weeks' time. In quinine blindness fair recovery has been the rule, though pallor of the disk, endarteritis and perivasculitis were noticed.

The following illustrative cases are from my records during the past five years. In the first three I have made a clinical diagnosis of embolism of the central retinal artery:

CASE I. Girl; 16 years of age. Had always been pale. Five years before had muscular rheumatism for a few days. Headaches were not uncommon. Family history, negative.

Retired one evening with good vision in both eyes; awoke barely able to see shadows with left eye. She consulted me during the third morning after the attack. I found vision reduced to shadows at two feet. The episcleral vessels were tortuous, the pupil did not respond to light, and was dilated 2/3 of the maximum. The intraocular tension was normal.

The media were clear, the optic disk was pale and slightly swollen, as was the adjacent retina. The entire retina was paler than usual, but was milk white about the disk and in the macular region. The arteries were thin, pale, with deficient light streaks, and could not be followed very far from the disk. At places on the disk and adjacent to it, the arteries were interrupted—apparently buried in the retina. The veins were broader than the arteries, except on the disk. At two points they were indented by the crossing of the arteries. A bright red spot was present at the macula.

A copious amount of nitrite of amyl was inhaled and forcible massage was practiced, but without avail. Potassium iodide and nitroglycerin were prescribed. The urine showed no albumin or sugar. Blood pressure later proved to be 145 mm. In ten days' time the retinal appearance had improved, although the disk was still pale, and the arteries even thinner than before. A few glistening dots were present between disk and macula. Could count fingers at three feet. Vision better in the temporal field.

Patient reports one year later that she has had occasional flickerings and momentary blurrings of vision in the opposite eye. In the affected eye, the disk is pallid and the arteries are atrophied and shortened. A few white dots are present at the macula. Vision amounts to 1/45.

Case II. April 15, 1908. Man, aged 60, of excellent habits. Occupation—formerly a mechanic, now in city fire department. Family and personal history negative until six years ago, when, while at work, the left eye became suddenly blind, and has since developed only enough vision to detect shadows. Three weeks before consulting me, he arose in the morning and found the right eye was totally blind.

Examination showed him to be a well-appearing, active man, whose temporal arteries were visible. The radial arteries were thick and rigid. The right eye saw shadows at ten inches; with the left he counted fingers at twelve inches. The tension of the right eye was a trifle minus, the pupil was dilated and inactive when the opposite eye was covered. The media were clear and the fundus showed few of the early signs of arterial obstruction. The disk was pallid, the arteries very thin with deficient reflexes, and they terminated quickly. The superior and inferior temporal arteries were barely visible at points where they crossed the corresponding veins. The macular region was somewhat granular and showed a few white dots.

The pupil of the left eye reacted to light. The media were clear. The disk was quite pallid. The arteries and veins showed little reflex and terminated quickly. The superior temporal, and both inferior arteries, showed parallel white patches. The macula was slightly granular.

Urinary analysis revealed a slight amount of albumin, some indican, no sugar, amorphous urates, many hyaline casts, acid reaction with Sp. G. of 1025. The blood pressure was 170 mm. Three months later the vision in the right eye amounted to shadows in the temporal field at one foot. The disk was even more pallid, the arteries of the retina were almost invisible, the temporals being detected at certain points as white streaks. The white dots formerly seen at the macula were not visible. The vision of the left eye had improved to the extent of 1/30 centrally. The fundus looked much the same, except that the white patches about the arteries had diminished.

Case III. Patient was man aged 35 years, and was seen by me March 14, 1908. Trade was that of machinist. Two years before had a seven months' attack of rheumatic fever—another of short duration one and a half years later. Had valvular heart disease dating since the first illness.

One week before consultation he fell asleep in his chair, and on awakening found right eye to be totally blind. Vision amounted to shadows in the temporal field at one foot. On covering the opposite eye, the pupil dilated and was immovable. The media were clear and the fundus showed the usual signs of obstruction of the central artery. The pallor, the narrow partially obscured arteries, and the contracted veins on the disk were present. Just out from the disk, and above the inferior temporal vein, was a flame-shaped hemorrhage. The patient was a brunette, and the macula presented a very dark spot instead of the cherry-red.

Urinary analysis was: Acid, Sp. G. 1008, trace albumin; few amorphorous urates, few hyaline casts and indican. Blood pressure was 124 mm. One month later after the administration of cardiac treatment, with iodide of potash, the vision was the same. The fundus appearance was more uniform, but no vascular improvement was noted. At the macula was a spot about the size of the optic disk, the lower border of which was hemorrhagic. The remainder of the spot showed degenerative changes—had possibly been a hemorrhage.

Four months after the attack, the macula showed only a few glistening white dots. The arteries as well as the inferior veins adjacent to the disk showed fine white parallel streaks. The vision was still shadows at one foot in the temporal field. One month later this man died from the complications attending his cardiac trouble.

Case IV. Patient was a ruddy looking man, 61 years of age. Seen January 19, 1907. Had been a soldier and farmer. Is a heavy eater, especially of meats. Uses no alcohol or tobacco. Said his left eye had been poor since a leg was amputated twenty years before. Past ten days had seen floating spots before the right eye. Six hours before consulting me the vision in this eye became almost nil, but had cleared some since. Examination: The radial pulse was bounding. Vision in the right eye was 5/12. The media were clear. The retinal arteries were pale and thin, and markedly indented the veins where crossing occurred. At certain points they appeared broken and interrupted for a short distance. The macular region was pale, and the retina was studded throughout with small linear and punctate hemorrhages. No point of obstruction was discovered, but a diagnosis of thrombosis of the central retinal vein was made. His family physician examined the urine and reported the lack of albumin or sugar. Nitroglycerin and salines were prescribed. The left eye had vision of 5/22. The retinal arteries showed perivasculitis, and an old chorioiditis was present at the macula.

He was again seen on February 11, 1907. Vision in the affected eye was 5/45. The fundus condition had not improved. The vessels were more involved, and the hemorrhages greater and more numerous. My knowledge of him ceased at this time, as he did not return.

In the following two cases there is not the slightest reason for the existence of emboli, therefore I have made a diagnosis of thrombosis of the superior artery of the retina:

Case V. Consulted me on December 29, 1905. Was a heavy, florid woman, married, 34 years of age. History negative except for frequent headaches and one attack of sciatica. Six days before had had a flickering and dimness before the right eye. Had since seen poorly from this eye on looking downward. The vision in each eye was 5/4, and the pupils reacted well to light. The media of the affected eye were clear. The superior half of the disk and retina were swollen and pallid, being sufficient at some points to cover the vessels. This retinal condition extended almost down to the macula. The arteries were all diminished in caliber, especially the superior ones. The veins were not remarkable, except that the small ones were quite tortuous. This was most marked on the superior temporal vein, where it had a feathery appearance. Extending from the nasal upper half of the disk was a large flame-shaped hemorrhage, broader toward the periphery. The macula was not affected. The upper field was contracted, and an absolute scotoma existed in the lower field up to within five degrees of the center. Nitroglycerin, potassium iodide and saline purges were prescribed. She was seen frequently and the fundus condition gradually improved.

One month after onset, the vision remained the same, the superior half of the disk is pale, as are the superior arteries. An atrophic spot marks the site of the formerly existing hemorrhage. The upper field is about the same, and the lower one extends downward to a point fifteen degrees below the blind spot.

Three months after the onset, the field was about the same. The fundus looked the same with the exception of the superior arteries, which were practically obliterated.

Case VI. Patient was a married woman, aged 52. Had always been in good health, although subject to saphenous varicosities. Saw her for the first time in March, 1905, when she came for refraction, which gave her vision of 5/5 in the right eye, and 5/4 in the left. The episcleral vessels were tortuous. A few thready vitreous opacities were present in the right eye. Fields were practically normal. At this time she related that three months before there had been a sensation of sparks before the right eye during the night, and vision was practically obliterated. In one week's time the usual vision was attained in this eye.

Thirteen months later she was again seen. She stated that during the night, thirty-six hours before, she awoke with a strange feeling in her head, and in the morning found that the pupil of the right eye was dilated and the vision very poor in this organ. A staggering sensation was present and objects were seen better in the upper field. I also learned that her physical condition had not been good during the previous few months. Vision in right eye was fingers in upper field at one foot; in the left eye, 5/5. On examining the eye I found the tension to be normal, the pupil was one-half dilated, and responded sluggishly to light. The ophthalmoscope showed several coarse vitreous opacities. The usual signs of obstruction of the superior retinal artery were present. No hemorrhages were seen, and the macula presented no cherry-red spot.

The urine was tested for albumin and sugar by the family physician and found negative. Nitroglycerin was at first prescribed. Strychnin, iodides and iron were given later. Seven days later vision had improved to the extent of 5/22, field was enlarging, fundus appearance was better. Some giddiness was still present when using both eyes.

One month after onset the vision was 5/30. The field showed a large scotoma below, and red was not perceived at all. The superior arteries were thin and the disk was pallid.

Two years after onset the vision was still 5/30, which was brought to 5/15 by means of a weak correcting lens. The fundus looked the same and the field had not changed except that red was perceived at all points outside of the original scotoma.

502 Lincoln Building.

EMBOLISM OF A MACULAR ARTERY AND THROMBOSIS OF SUPERIOR AND INFERIOR RETINAL ARTERIES IN A CASE OF EMBOLIC SOFTENING OF THE BRAIN.*

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PHILADELPHIA.

Pathological Examination, By Chas. M. Hosmer, M. D.,

PHILADELPHIA.

The patient from whom the eyeball herewith described was obtained was a Jewish woman, 41 years of age. She was admitted to the German Hospital, Philadelphia, November 22, 1907, and died there twelve days later.

The medical diagnosis was uremia, chronic parenchymatous nephritis, broncho-pneumonia, and left-sided cerebral disturbance, which autopsy proved to be softening with hemorrhage.

The ophthalmic diagnosis was *embolism of a macular artery*, a condition which has been confirmed by the pathological examination. It may be questioned whether the obstruction found is an embolus or a thrombus, but the weight of evidence favors the former.

The case is of interest in that the eyeball, which was removed a few minutes after death, contained a condition difficult to secure for examination in the acute stage, and while the exact age of the obstruction is not known, the complete cycle of events pertaining thereto was but eighteen days. It is probable, moreover, that the eye condition was subsequent to the brain condition, which marked the fatal onset.

Six days before admission to the hospital the patient, while sitting on a chair, suddenly became faint and fell to the floor. She had convulsive movements of the arms and legs lasting about ten minutes. She then passed into a semi-comatose state, in which condition she remained until death. From her husband it was learned that she had had "kidney trouble" for the past five years, and frequently had fainting spells similar to the present attack, but from which she had always recovered within a few hours.

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*Read before the American Ophthalmological Society, New London, Conn., July 15th, 1908.

Examination of the patient showed much emaciation. Eyelids held in half closed position. Right labio-nasal fold obliterated; right side of upper lip drooped over mouth cavity. Jaw dropped, and breathing through mouth. The limbs were moved in response to irritation. The heart sounds were disordered, there being slight presystolic and systolic murmurs heard at the apex. The second aortic sounds were valvular and relatively accentuated; there was no thrill.

The left arm and leg were frequently moved; there was no spasticity; the reflexes on that side were normal. The right arm and leg were not voluntarily moved. Both were spastic; the knee-jerk was exaggerated; the Babinski and Gordon reflexes were both present. The broncho-pneumonia supervened November 29th, five days before death.

The notes from the Pathological Department of the German Hospital concerning this case are in brief as follows:

The urine contained albumin 1-2 volume. No sugar; urea varied from .022 grms. to 1 cc., to 2.5 per cent.

Autopsy, December 4, 1907:

1. Chronic interstitial nephritis.

2. Broncho-pneumonia.

3. Softening and hemorrhage of the brain (left hemisphere with edema of the meninges and foci of round celled infiltration.

Section of Kidney showed also chronic parenchymatous nephritis (late stage) with foci of sclerosis.

Liver.—Congestion, slight fatty infiltration. Foci of necrosis.

Spleen.—Large interstitial hyperplasia.

The examination of the eyes upon day of admission showed both sides, conjunctiva pale and clear; no lacrimal disturbances, no deviation or apparent paralysis. The pupils were 2/3 and evenly dilated; reaction to light was not prompt.

Ophthalmoscope O. D. Media clear, disk well defined, vessels of uniform calibre, arteries rather pale, light streaks present; no hemorrhages or exudations.

O. S. Media clear, disk margin blurred; vessels uneven and of variable calibre; the veins are full. At the posterior pole is an extensive area of edema in the center of which is the macula presenting the characteristic picture of the cherry-red spot in acute obstruction. In the edematous area, the smaller vessels coursing toward the macula are enlarged and plainly seen.

The macular spot has a diameter about one-half that of the disk. There are a few hemorrhages, notably a small one below the disk in the course of the inferior temporal vein, and a large triangular one with its base coincident with the temporal margin of the disk and its apex terminating near the macula.

The water color sketch by Dr. Mary Buchanan shows well the fundus picture two days before the death of the patient.

As there was no visible evidence of obstruction in the central retinal artery or in any of the larger branches, and as there was no cilio-retinal vessel present, the diagnosis of embolism of a macular artery was made, as best explaining the fundus picture.

Some three hundred serial sections were made by Dr. Hosmer, and we are able to show the obstruction situated as supposed in a macular artery.

PATHOLOGICAL REPORT.—DR. C. M. HOSMER.

The eye was fixed in formalin for 22 hours, then in Zenkers' fluid for 18 hours (secondary fixation in Zenkers' was for the purpose of preventing that contraction of tissues which occurs after fixation in formalin and subsequent hardening and dehydration in alcohol—this was not accomplished). Then washed and hardened in iodized alcohols of increasing strengths. Frozen, and a 10 mm. central horizontal disk taken for microscopical study. This was embedded in celloidin and cut *in toto*. The sections, twenty microns in thickness, were mounted serially, being stained alternately by hematoxylin and eosin, and Van Gieson's.*

Sections show the anterior half of the eye normal save for signs of old marginal ulceration of the cornea, and a recent infiltration at the margin down and in. The pathologic changes in the posterior half of the eyeball are confined to the retina and the optic nerve.

An apparently homogeneous, internal limiting membrane is unusually prominent, especially on the temporal side, having a sharp anterior, and an irregular posterior outline. The inner endings of the retinal supporting fibers are united intimately with the foregoing, save in a broad band circumscribing the fovea. In the area of this band, the appearance is that of the membrane having been pushed off from its retinal attachment by serous fluid. Some finely granular debris remains beneath the now lax membrane. The membrane is closely adherent over the fovea. In the perifoveal zone above mentioned, there is noticeable disappearance of supporting fibers. In the position of the nerve fiber layer there has been practically complete disappearance of the essential elements; there remains little more than a meshwork of supporting fibers, trellising blood vessels in places. The spaces between these remaining fibers are larger on the temporal side where the edema has been more intense. Partially filling these spaces is very finely granular matter, blood corpuscles and tissue debris. In some sections a horizontal stratification suggests remaining fibrous bundles; these, however, are found degenerated, and without sharp outline.

The ganglion cell layer shows degeneration of all these cells. This is most marked in the region of the macula, where, in the main, the cells are swollen, practically homogeneous, and the nuclei stain not at all or very poorly. On the nasal side many of the cells lie in cystic cavities, many have disappeared, and those remaining are shrunken.

There seems to be generalized accentuation of the spaces of the internal reticular layer.

The elements of the internal nuclear layer show fairly well generalized edema infiltration with separations, which in many places amount to fairly large cystic spaces. Throughout the layer many cells show degeneration; in the macular region this is total with fragmentation of the nuclei. In the far temporal portion of this layer, increasing from below upward, there is very marked so-called cystic degeneration of the retina—large spaces filled with clear fluid separated by strands of supporting fibers.

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*These are numbered 1.1, 1.2, 1.3, S.1, S.2, S.3, etc., as they lie below or above a section chosen as the central.

The external reticular layer shows edematous separation of its outer portion, Henle's layer. This is more marked on the nasal side. In the temporal periphery, "cystic degeneration" of the retina involves this layer for a short distance.

The external nuclear, external limiting membrane, and rod and cone layers are normal, save as they show mechanical disruption with secondary degeneration, as shall be described later.

The retinal arteries show a thrombotic process beginning at their origin from the arteria centralis retinae, and extending into each for a distance of about 0.5 mm.; these arteries are the superior and the inferior main stems, and a large nasally directed branch. Their greatest diminution of lumen is seen in sections S. 3; I. 14 and I. 6, respectively; we would estimate these reductions as 8/12 for the superior, 6/12 for the inferior, and 7/12 for the nasal. The thrombotic mass lies upon the degenerated endothelium of the vessel, and is made up of finely granular, almost homogeneous material, taking the eosin stain by hematoxylin and eosin, and picric acid by Van Gieson's, and contains a few nuclei. In some parts this does not completely fill the space occupied by the thrombus. This mass is covered by new formed endothelium. The position of the thrombus varies, but for the most part, in the superior and inferior vessels it is apposed to the anterior portion of the lumina. The subendothelial connective tissue of the vessel wall apposed to the thrombus is very loosely arranged and partially fills a space between the endothelium and the lamina elastica.

The arteria centralis retinae appears normal. A temporally directed artery is given off from the superior stem; this is entirely occluded at its origin by a mass of hyaline material filling in the temporal edge of the here flattened parent stem. In the center of this mass there is an ovoid more highly refractile body, an embolus. (?) This vessel, traced by examination of many sections, runs to the macula and was apparently the principal nutrient vessel to that region.

The optic nerve presents the appearance of generalized degeneration of the fiber bundles. The remains of these lie in the spaces of the supporting fibrillae as granular detritus, or as swollen homogeneous strands.

The walls of the central vessels of the nerve appear normal.

Taking up now a mere detailed description of the macular region, we find overlying the fovea the membrana limitans interna firmly adherent. For a considerable distance on all sides of this central area of the macula, the membrane is loosened from its attachment with the nerve fiber layer. The space beneath this detachment is in great measure free; in the position of the nerve fiber layer, however, the granular debris of the structures of this layer presents.

There is advanced necrosis of the cellular elements of the ganglion cell layer and of the internal nuclear layer as has been described.

In those sections showing the "fovea," I-41 to I-60, recognized by the thinning and final disappearance of the ganglion cell layer over this area, this is found, instead of being depressed, to have its inner surface on a level with the surface of the thickened balance of the retina. The peripheral supporting fibers of this spot have the appearance of being stretched, and have an oblique direction from the periphery inward. This appearance is more marked on the temporal side. The membrana limitans externa is displaced forward, being on a line with the internal reticular layer of the surrounding macula. The portion of the membrane corresponding to the foveal spot is detached at its margin from the balance of the membrane. At the foveal periphery, the retinal structures describe a double curve from without inward, first a curve anteriorly and away from the fovea, then in toward the later. A few elements of the rod and cone layer remain attached to the membrane, but these are for the most part detached from it, and a mass of finely granular matter is interposed. The rods and cones are distorted and in various stages of degeneration; a large cystic space lies posterior to this forward displacement of the foveal fundus. The pigment layer in this region shows some disturbane, displacement and swelling of some cells and a few low drusen formations. The external limiting membrane for a short distance about the foveal region shows wrinklings with distortion of its penetrating rods and cones. Throughout the macular region the venules and capillaries are dilated, show about them small hemorrhages and in some sections show their contents congested.

Pathological Conclusions.

I. The widespread degeneration of those retinal layers dependent upon the retinal vascular supply for nutrition is due to diminution of this supply by partial thrombotic occlusion of the arteries. The more intense degeneration of the macular region is due to total obstruction of its principal nutrient artery. The process here amounts to ischemic necrosis.

II. The edema is due to alterations in the vessel walls rendering them more permeable and permitting the transudation of serum.

III. That the hemorrhages are due to similar causes as is the edema.

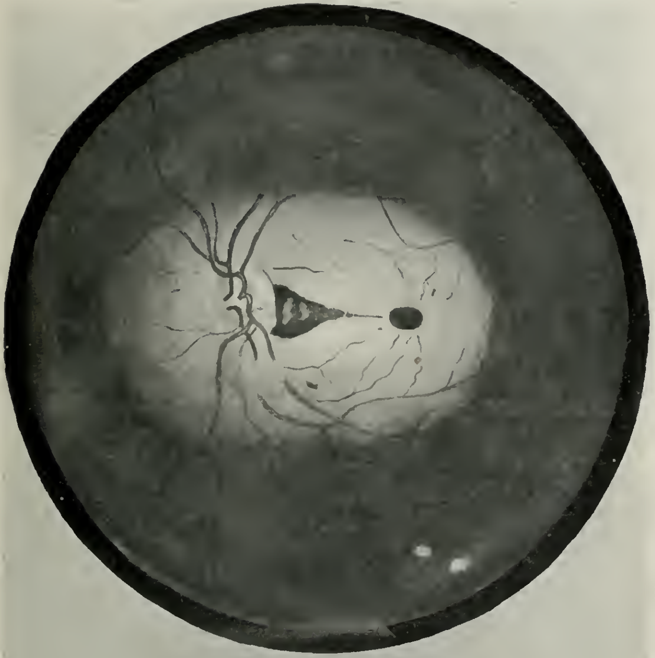
IV. That the amour . of edema was probably increased, and the hemorrhages in part caused by back pressure in the veins.

V. That there has been an umbilicated bulla about the fovea, the anterior covering of which was the membrana limitans interna, and the fundus of whose umbilication was the fundus of the foveal spot.

VI. That by means of pressure the fluid of this bulla has been put under sudden tension with expansion in the direction of least resistance, which was through the membrana limitans externa, by rupture of this membrane. Prior to this by nature of its anatomical relations, there was wrinkling of the membrane about the fovea.

That therefore this appearance is of artificial production, probably at the time of enucleation.

2031 Chestnut Street.



Embolism of a Macular Artery.

Sketch made two days before death of patient.

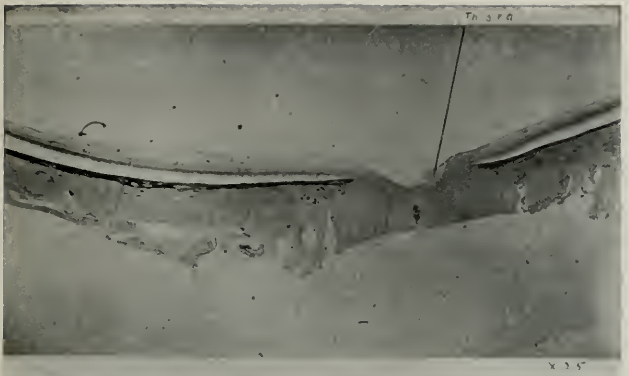


Fig. 1. Shows thrombosis of superior retinal artery on disk (Th. s.r.a.) and edema of retina.
(Magnified 25 diameters.)

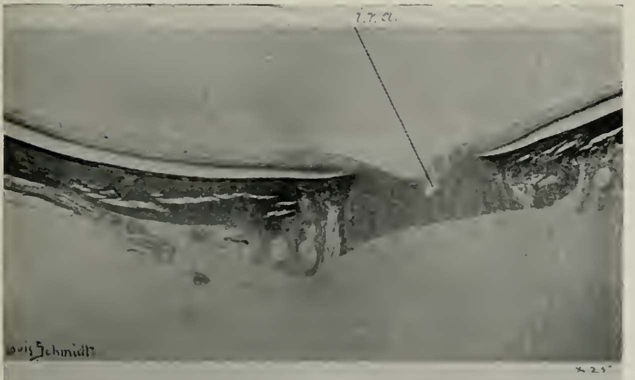


Fig. 2. Shows thrombosis of inferior retinal artery (i.r.a.) on disk and edema of retina.
(Magnified 25 diameters.)

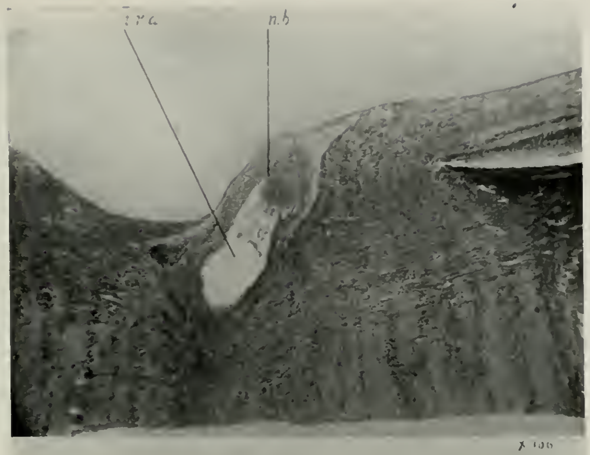


Fig. 2a. Shows thrombosis of inferior retinal artery on disk. (i.r.a.) and edge of nasal branch. (n.b.) (Magnified 106 diameters.)

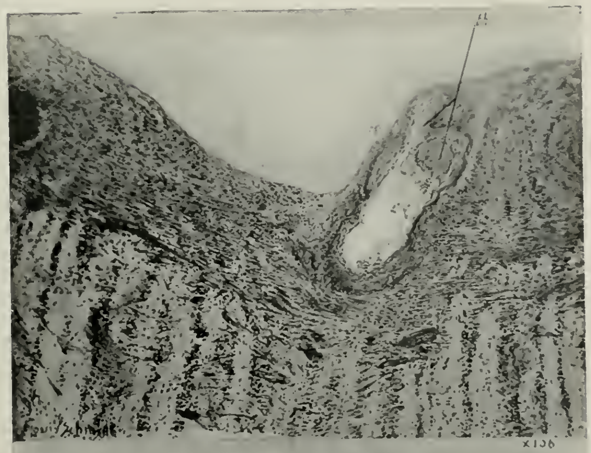


Fig. 3. Shows thrombosis of inferior retinal artery on disk and extension of thrombus (th.) into nasal branch. (Magnified 106 diameters.)

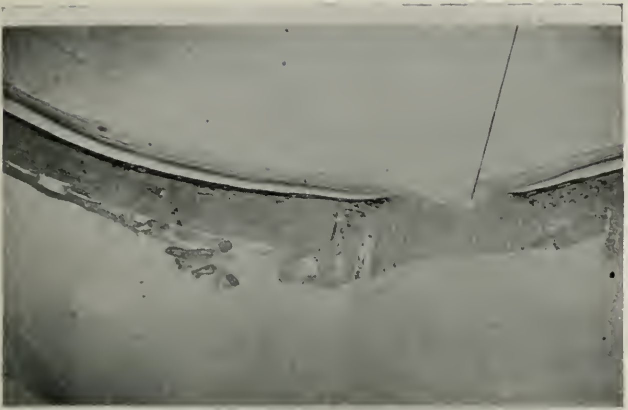


Fig. [illegible]. Shows thrombosis of inferior retinal artery
(th. i.r.a.)
(Magnified [illegible] diameters.)

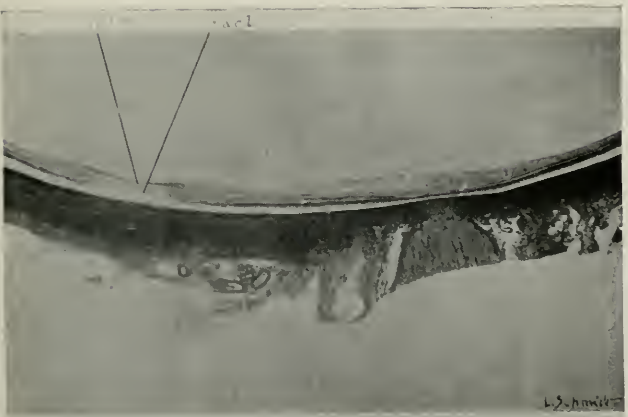


Fig. [illegible]. Foveal region showing elevation of external limiting membrane (e.l.m.) and remnants of rod and cone layer (r. & c.l.) displaced.
(Magnified [illegible] diameters.)

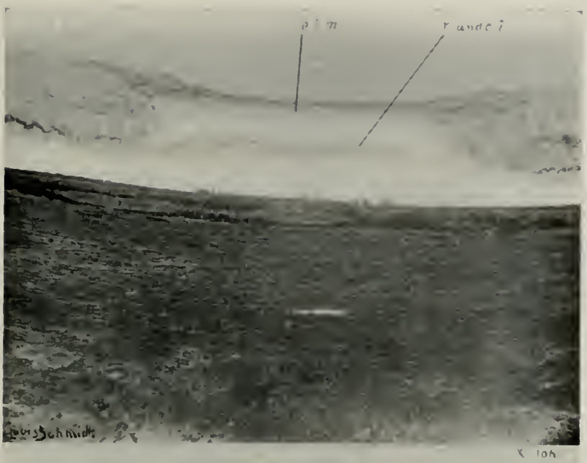


Fig. 5a. Foveal region showing elevation of external limiting membrane (e.l.m.) and remnants of rod and cone layer (r.and c.l.) displaced. Interposed layer of serous fluid.
(Magnified 106 diameters.)

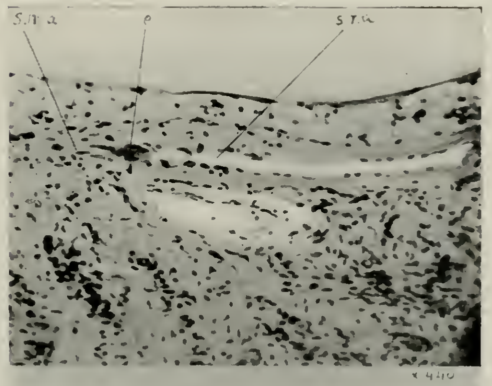


Fig. 6. Shows Embolism (e) of superior macular artery (s.m.a.) at its origin from the flattened superior retinal artery. (s.r.a.)
(Magnified 440 diameters.)

ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

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NEW YORK.

The Treatment of Trichiasis.

BUTLER, T. HARRISON (*Archives of Ophthalmology*, July, 1908), divides his cases into three groups: those caused by entropion, those caused by the growth of adventitious lashes in a false position, the so-called "distichiasis," and, finally, those caused by a combination of these two. The last group contains the largest number of cases which require treatment in a land where trachoma is endemic. The first object of a trichiasis operation must be to effect a permanent cure, the second, to remedy the defect without producing lagophthalmus or other deformity. Trichiasis operations naturally fall into two groups: those in which the tarsus is split from the edge, and those in which it is divided transversely. There is a third group of operations only applicable to trichiasis localized at the canthi. After performing over a thousand operations the writer finds that the following methods meet all cases: Van Milligen's, Snellen's, a modified Spencer-Watson, and simple incision with a lip graft. The last two are only applicable to special cases. The splitting operations which the writer has tried are: the Jaesche-Arlt, a combination of Arlt's operation with Holtz's; Waldhauer's operation and Van Milligen's operation. After considering the cause of failures in the other operations the writer concludes that the Van Milligen is the only satisfactory splitting operation. It is especially indicated where there is conjunctival atrophy, where the tarsus is short, and in relapses from other operations, especially from Snellen's. The chief operations in which the tarsus is divided transversely are Snellen's, Panas's and Burow's, of which Snellen's, as modified by Cant, has been performed in the British Ophthalmic Hospital, Jerusalem, considerably over ten thousand times. In selected cases it gives an excellent result, and the cosmetic effect is almost always good. Van Milligen's and Cant's operations are applicable to most cases of trichiasis. For slight cases Cant's is better, it being remembered, however, that it weakens the tarsus and shortens it; on the other hand, Van Milligen's operation lengthens the conjunctiva which is being shortened by the disease, it removes nothing and so can be applied to all cases. So far the writer has never seen a recurrence from Van Milligen's. For trichiasis of the lower lids he always performs Snellen's operation exactly as for the upper lid. H. G. G.

Extirpation of the Lacrimal Sac.

Wyler, Jesse S., Cincinnati, Ohio (*Ophthalmology*, Oct., 1908), considers that there are four conditions in which operation is justified: 1st—Changes in the walls of the sac, particularly of the lining cells, which are often altered in character or are replaced by granulation tissue. It has often been observed that the sac has been affected with trachoma; in fact, it has been considered by some that the sac is the starting point of this disease. Not infrequently malignant growths necessitate extirpation of the sac. 2nd—Chronic blenorrhoea, which rarely yields to probing, because of the long time required and the great pain attending the process. 3rd—Any ulceration of the cornea, which may be aggravated by the infected secretions of the sac. In particular, ulcus serpens makes a rapid recovery after extirpation of the sac, as does also fistula, following dacryocystitis. 4th—In all cases of stenosis an intraocular operation can be made sterile only after extirpation of the sac. A. F. A.

Preliminary Report of a Theory of the Etiology, Prevention, Pathology, Treatment and Cure of Trachoma.

Eaton, Frank B., Oregon (*Ophthalmic Record,* September, 1908), has published a preliminary report of a theory of the etiology, prevention, pathology, treatment and cure of trachoma. His claims are that trachoma is primarily an infection of the blood by micro-organisms which are protoplasmic bodies that enter the human vascular circulation through the conjunctiva palpebrae. That these are carried by insects, some of which introduce them by biting, and others carry them on their mandibles, legs, etc. These parasites are of two kinds: one, the exogenous (Koch), which is introduced by biting; the other, endogenous, which is carried as before stated. That the life of the exogenous parasite includes a primary, an intermediary and a human host. That the life of the endogenous parasite begins and ends within the blood and tissues of human beings, and obtains access to the human vascular system through the capillaries of the integument and conjunctiva palpebrae, and is the only one which is infective from one human being to another; consequently, that there are two similar but distinct diseases which are clinically termed trachoma, but which are really quite different, both biologically and pathologically; one being contagious and caused by the endogenous parasite, while the other is noncontagious and caused by the exogenous parasite. That the prevention, treatment and cure of both forms of this disease should be most successful by the application of the principles of the theory of opsonin. O. W.

The Conjunctival Tuberculin Test.

Mannheimer, George, New York (*New York Medical Journal*, September 5, 1908), says he has records of 350 tests on 260 people and concludes: "My general impressions are: The conjunctival test has fulfilled all reasonable expectations. It is beset with apparent discrepancies which we are yet unable to explain. It opens up many new and interesting questions. It will, of course, never take the place of a careful physical examination. It requires caution in its application and interpretation. It should be used judiciously so as not to bring it into discredit. It is important that we try to follow up our cases so that we ultimately get an insight into the causes of the failures of the method." M. L. F.

The Calmette Reaction as a Diagnostic Aid.

Oberndorf, Clarence P., New York (*New York Medical Journal*, September 5), gives an account of the way in which this test has been used in the medical service of W. Gilman Thompson at Bellevue Hospital. In the 83 cases in which the test was employed there is no record of harm having been done to any eye. He asserts that while Calmette's test is not infallible, he has found it harmless and on a par, so far as reliability is concerned, with throat cultures in suspected diphtheria, Widal's in suspected typhoid, or leucocyte counts in obscure febrile cases. M. L. F.

The Tuberculo-Ophthalmic Reaction.

Christian, Frank L., Elmira, N. Y. (*New York Medical Journal*, September 5), reports 500 observations. It was observed that if any healthy individual was subjected to frequent tests a positive reaction could be obtained. In the majority of the patients the reaction is noticeable in from 8 to 15 hours, but it may appear in from 4 to 48 hours. Often it was slight and fleeting, a few cases had a severe conjunctivitis, but no permanent damage was done in any case. He concludes: "The test is rapid, simple, and convenient. If necessary to repeat it should not be applied to the same eye. A positive reaction may follow frequent instillations in a normal individual. The test should not be applied to any but a normal eye; serious results may follow instillations into a diseased eye. The reaction is of value in the diagnosis of early tuberculous lesions. The reaction is negative in the advanced lesions of tuberculosis. The reaction alone cannot be held to be conclusive, still in the presence of other signs it furnishes confirmatory evidence of much importance. The reaction occurs in conditions other than tuberculosis, and must still remain secondary to a careful physical examination."

M. L. F.

Case of Papilloma of the Cornea.

SMITH, EUGENE, Detroit, Mich. (*Ophthalmology*, October, 1908), reports the case of a healthy farmer, 43 years of age, who was unable to close the lids of his left eye because of a cauliflower shaped growth about the size of half an English walnut. The growth started from the outer sclero-corneal margin and has been growing for three years. The tumor consisted of nodules of epithelial cells apparently arising from the conjunctiva of the bulbs, near the limbus. Irregular branches of tumor cells had invaded the superficial layers of the cornea.

A. F. A.

On the Protective Influence Exerted by the Iris in Perforating Wounds of the Cornea.

TOOKE, F. T., Montreal (*Ophthalmic Record,* August, 1908), says that in considering the protective influence exerted by the iris in perforating wounds of the cornea two important features have to be regarded; the poor nutritive supply of the cornea and the rich vascular supply of the iris. As wounds of the cornea are frequently of an infective nature, the prevention of the entrance of bacteria into the anterior chamber and the avoidance of subsequent panophthalmitis as well as the carrying of the localized infection to the general circulation are materially assisted by the mechanical action of the blood vessels of the iris. They assist in the formation of granulation tissue, and also of connective tissue elements which tend to close the perforation.

It frequently happens that this effort of the iris is not only unsuccessful, but tends to further injury, as it often becomes caught between the lips of the wound and is irritated by the action of its fibres in the process of accommodation. In such cases good results may be obtained by iridectomy or by releasing the anterior synechiae. O. W.

A New Knife and Method for Iridotomy.

Jobson, G. B., Jr., Pennsylvania (*Ophthalmic Record,* September, 1908), describes and illustrates a new knife devised by himself and Dr. H. P. Hammond, which he says is similar to a cystotome with a large blade set at a carefully calculated angle, but that it makes its own incision and cuts with a minimum amount of dragging.

This knife has been found very useful in a method for producing an artificial pupil, and is adapted for incising the capsule of the lens, etc. O. W.

Complete Peripheral Capsulotomy.

Valk, Francis, New York (*Ophthalmic Record,* August, 1908), says that for some years he has made a peripheral incision with the sharp edge of the minute knife on the distal end of the cystotome by advancing the knife until the tip goes under the iris, turns it, and with the tooth makes the incision into the upper part of the capsule parallel with the corneal incision, six or seven mms. in extent. For this purpose he has devised a modification of the cystotome, which consists of a long rounded and straight shank terminating in a needle point rounded on the sides and placed at right angles to the straight shank. The different positions in which this needle can be used are illustrated and seem to indicate that the instrument may be a very useful one. O. W.

Glaucoma Following Secondary Cataract Operation.

Cheney, F. E., Boston, Mass. (*Ophthalmology,* October, 1908). Glaucoma following secondary cataract operation is usually, if not always, the direct result of injury to the vitreous body. The principal factor is the obstruction of the filtration angle by vitreous, which has escaped into the anterior chamber through the perforated posterior capsule and to a greater or less extent replaced the aqueous. Or else, if it does not enter the anterior chamber, it may press forward the iris and thus obliterate temporarily the filtration angle over a certain segment of its circumference. This complication occurs in only about one per cent. of the secondary cataract operations. In the normal eye the posterior surface of the lens rests in direct contact with the vitreous, except at the small area occupied by the anterior end of the lymph canal, which extends from this point backward to the optic disk. After the removal of the lens the posterior capsule is forced backward to a vertical plane behind the iris and pupil. The distance of the vitreous body from the capsular membrane probably varies according to the depth of the newly formed lymph space, which separates these two structures, and this is the important factor in determining the liability to injury of the vitreous in the performance of a capsulotomy. The nearer the anterior surface of the vitreous to the posterior surface of the capsular membrane the greater the danger of its being punctured. Then, again, it is reasonable to suppose that the normal vitreous is more of an obstruction than a vitreous that has become partially degenerated and that will liquefy more speedily. It is impossible to avoid this complication, but it is important to avoid injury to the vitreous by making the incision at the central portion of the capsule and not too deep, and also, if the accident does take place, not to evacuate the anterior chamber. The use of myotics is indicated in this condition and only occasionally is an iridectomy or at least the corneal incision preparatory to an iridectomy needed to free the angle from any vitreous that may be lodged there.

A. F. A.

The Treatment of Chronic Simple Glaucoma.

Veasey, C. A., Philadelphia Pa. (*Ophthalmology*, October, 1908), states that he prefers iridectomy in the treatment of this condition, although in many cases it may be wise to employ a combination of the myotic and operative treatment. If the disease is not far advanced, the field of vision not markedly contracted, the central visual acuity good and there are no scotomata, it seems better to employ weak solutions of eserine, gradually increasing the strength as the effect on the eyeball diminishes. The use of the eye should be restricted, the refraction corrected, the gouty or rheumatic diathesis eliminated and the patient's vitality improved as far as possible. If, notwithstanding, the field of vision continues to contract, central vision becomes more or less impaired and a scotoma begins to appear in the field, it becomes necessary to do something more and an operation should be advised. However, if the patient is old and infirm it may not be advisable to perform one. Also, if one eye is blind and the disease is present in the other eye, it may be advisable to avoid operative procedure. Often when both eyes are affected and one very much more so than the other, it may be wise to operate on the bad eye first, to test the "temper" of the eye under operation. Advice must be governed by the conditions of each case and the operation must be done with the idea of holding the disease in check, not to cure it. Five case histories are given in full, in several of which iridectomy checked the disease after myotic treatment had failed. A. F. A.

Brief Report of a Case of Hallucination and Other Nervous Symptoms Coincident With Astigmatism Seen and Corrected Ten Years Previously.

FERNANDEZ, J. S., Havana, Cuba (*Ophthalmic Record,* September, 1908), reports a case of hallucination and other nervous symptoms coincident with astigmatism seen and corrected ten years previously by Dr. Oliver, of Philadelphia, who in 1899 referred the patient to Dr. Fernandez for re-study of and a report on his ocular conditions. In his note of introduction Dr. Oliver informed Dr. Fernandez that the attacks of which this patient complained were right-sided and migrainous in character, followed at times by epileptic seizures—the aura being visual, and consisted of a gladiatorial dwarf who rapidly approached from a distance, increased in size, and felled the patient to the ground. These attacks took place in warm weather and had increased in frequency and severity.

Dr. Fernandez saw this patient three years after the case had been studied, and two years after the symptoms had ceased. He found the eye conditions as Dr. Oliver had reported, and made no change in the glasses.

At the time of writing it is ten years since the disappearance of the hallucination, and the patient is well, and hard at work in his profession as attorney. O. W.

The Ocular Symptoms of Ethmoidal Disease.

KRAUSS, FREDERICK, Philadelphia, Pa. (*Ophthalmology*, Oct., 1908), gives a history of five cases, the first of which had been under treatment for several weeks, the patient being unconscious, with a temperature of 106° to 107°, and a weak pulse. Pus was formed under the periosteum of the orbit. The patient died in a few hours. The next case appeared to be an infection of the deeper subcutaneous tissues, resulting in abscess of the orbit, pointing through the center of the upper lid. After evacuation, some oedema remained and the wound continued as a sinus. No definite conclusion was reached for eleven months when a distinct tumor was found, and an operation revealed a small flat sequestrum, 4 mm. round, of the outer plate of the inner orbital wall. This was removed, the walls curetted and drainage provided, after which convalescence was rapid and uneventful. In the next case the symptoms subsided except a dense tumor, deep in the orbit. Operation and drainage effected a rapid cure. The fourth case made a rapid recovery after operation. The last case was of a man of fifty-one years, who had suffered for many years from severe pain over the left eye, without other specially marked symptoms. Oedema and tenderness led to operation, which resulted in a complete recovery. The earliest symptoms are oedema of the upper lid and tenderness to the touch. The lower lid may become chemotic. Extension is marked by increased oedema, a slight tumor being evident upon deep pressure alongside the nose next to the eyeball. If the orbital tissue becomes oedematous, exophthalmos outward and downward is produced. The tumor is usually over the os planum. The ophthalmoscopic appearances may vary from negative to oedema of the nerve and retina, choked disk and optic atrophy. When the ethmoidal cells are involved there is pain at the root of the nose, around and back of the eye, increased by the stooping position and usually worse in the morning. If the brain or meninges become involved the usual symptoms of that condition are added. Hirschfeld found that 60 per cent of cases of orbital inflammation were due to disease of the nasal sinus and of these 20 per cent were due to ethmoid disease, and in 15 per cent the ethmoid cells were involved with the frontal, sphenoidal and central cells. A. F. A.

The Cultivation of the Meningococcus From Eye Conditions Complicating Epidemic Cerebro-Spinal Meningitis.

McKee, Hanford, Montreal (*Ophthalmic Record*, September, 1908), reports a successful cultivation of the meningococcus from eye conditions complicating epidemic cerebro-spinal meningitis. The case was one of metastatic ophthalmia, the patient being a child seven years old, whose illness commenced with vomiting of blood-stained fluid, followed by frontal headache and pain in the back of the neck. He had bright subconjunctival hemorrhages in each eye, became unconscious within a few hours, developed a hypopyon of the right eye on the following day, and died on the third day.

At the postmortem the right cornea was seared with a hot surface. With a sterile hypodermic syringe pus was withdrawn from the anterior chamber and planted on haemoglobin agar. After 24 hours the growth was so thick, isolated colonies could not develop. The micro-organism was a Gram negative diplococcus which coincided with the Gram negative diplococcus isolated from the cerebro-spinal fluid, i. e., meningocccccus. O. W.

Microphthalmia.

Cunningham, H. H. B., Belfast, Ireland (*Ophthalmology*, October, 1908), reports the case of a child 13 years old, whose left eye was about three-quarters the size of the right, but whose orbits were equal in size. No defects were present in either eye except a cataract in the left. There were no defects of the body except such as are due to rachitis. A. F. A.

A Solution of Dr. George T. Stevens' "New Phenomenon of Color Conversion."

Blaauw, E. E., Buffalo, N. Y. (*Ophthalmology*, October, 1908), presents an article suggested by an article by Doctor Stevens in the *Journal of the American Medical Association*, July 21, 1906, wherein Stevens discusses the phenomenon of the disappearance of a narrow strip of color surrounded by a much larger area of a complementary color and several modifications of the same, and late in the article states that he considers this to be "an objective phenomenon." The writer takes issue on this point, preferring to consider the whole matter of color "purely subjective." A few fundamental facts as given by Ewald Hering are stated as follows: 1. Fixation of a light spot on a dark background produces, after elimination of the excitation, a spot darker than the surrounding area and bordered by luminosity. The greatest luminosity is seen closely surrounding the dark spot and gradually diminishing toward the periphery. This is due to "successive light induction." 2. When one fixes a strip of gray paper on a dark background and then inserts a large white sheet between the strip and the background, the strip will become much darker; on removing the white sheet the strip becomes much lighter again. This is due to "simultaneous light contrast." 3. When we fix a point at the limit of a black and white ground the deep black passes over into gray and the white becomes darker. This is due to "simultaneous light induction" with fixation of a border line between bright and dark, the dark becomes darker still, especially near the contact with the bright, "simultaneous contrast"; then the dark begins to lighten, most markedly at the border line, "simultaneous light induction," a condition which remains for a long time, even when the illumination is diminished, or the eyes are closed, "successive light induction." All these phenomena demonstrate that the excitation and sensation of a part of the retina depend not only upon the illumination of the part itself, but also upon the illumination of the rest of the retina. The same phenomena which are observed for dark and light are produced in the same way for yellow and blue, green and red. All living matter undergoes chemical changes, which correspond with function. Dissimilation, katabolism, consumption, is followed by assimilation, anabolism, restitution. We may accept that white light produces dissimilation and Hering assumes that the corresponding assimilation produces black, contrary to Helmholtz. When a part of the visual organ is excited by light, the remainder and especially the neighborhood of the macula perceives blacker than before, due to an increase of the assimilation. Dissimilation lessens the dissimilative material, but will stimulate assimilation, which produces new material for dissimilation until equilibrium is established. Hering accepted three different visual substances, the white-black, the red-green and the blue-yellow. The sensation of white, or light, corresponds to dissimilation, while that of black, or dark, to assimilation. The same applies to the other visual substances. With the excitation of a colored visual substance an excitation of the black-white substance is always combined, hence an ideal pure color can only be imagined. Applying these principles to Stevens' experiments, to quote Hering's description of similar phenomena, "through the stimulation and increased dissimilation in the lighted parts, the assimilation becomes increased into other parts, which means that these parts are seen darker. This increased assimilation produces in the dark parts an increase of the irritable substances and also of the dissimilative irritability. The weak light coming from the dark background produces on the light dispersed from the white parts a continuously increasing dissimilation, while the assimilation does not increase, but, rather, slowly decreases. This means a renewed increase of the apparent brightness in the parts darkened before by contrast. As, while the background becomes lighter through simultaneous induction, the lighter parts become slowly less light because of dissimilation, so, before long, the condition arises that the brightness of the background has increased by the same amount as the brightness of the light part has, at the same time, decreased, background and lighter parts go over in each other without distinction. Hering never regarded his theory as an expression of retinal processes. If Hering's substances are regarded as central, the difficulties, to a great extent, will disappear. In fact, he only adopted the conception of three special substances in order to assist the exposition of his views. In this theory we can understand how katabolism at once increases anabolism, which processes mutually limit each other and preserve the organism from excessive and destructive changes. A. F. A.

Artificial Illumination of School Rooms.

Standish, Myles, Boston, Mass. (*Ophthalmology*, October, 1908). It is difficult to properly light a school room, even during the day time, but at night the difficulty is much greater, owing to the fact that the central field of vision should be but slightly better illumined than the general illumination of the room, there should be no shadows of the pen upon the written word nor of the head and shoulders over the page. The blackness of the windows and blackboard both diminish the amount of reflecting surface and offer painful contrasts in illumination. Careful experiments have demonstrated that the room should be illuminated by at least nine centers of light arranged at intervals somewhat to the left and in front of the middle of the room, that the walls should be painted a very light green or buff, the windows should be curtained with a hand-painted gray-green shade, the woodwork should be finished in light shades and not polished, the source of light should be one of the newer forms of incandescent electric light, with Zalinsky shades, which give the most and best light, do not vitiate the air, can be most advantageously placed and in most cities do not cost greatly in excess of gas.

A. F. A.

ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

(GREAT BRITAIN AND THE ENGLISH COLONIES.)

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The Causes and Symptoms of Thrombosis of the Cavernous Sinus.

THOMSON, ST. CLAIR, London (*Ophthalmic Review*, October, 1908). The author properly says while the causes of thrombosis of the cavernous sinus are chiefly found in diseases of the nose and ear, the symptoms are more prominent and distinctive in the eye, and hence fall largely under the observation of the ophthalmic surgeon.

The source of infection though frequently attributed to some lesion of the nose or upper lip, to a carious tooth, or a phlegmon of the face and neck is, according to the author, found in accessory cavities of the nose, the most common being the sphenoidal sinus.

The anatomical relations of the venous sinuses are recalled, and by diagram the relation of the ophthalmic veins are shown.

A case is reported, the source of infection being the otitic on the left side, while the earliest ophthalmic changes were on the right.

Next to diseases of the sphenoidal sinus, pyogenic infection from the ear is the most common cause of thrombosis of the cavernous sinus, third in frequency, probably the ophthalmic vein, and last, infection through the pterygoid plexus. Symptoms of co-existing meningitis, together with papillary edema, chemosis, and exophthalmos suggest the possibility of thrombosis. They develop from 6 to 16 days from the onset of symptoms indicating the spread of infection. Neither proptosis nor chemosis may develop in a rapidly fatal case. The edema and proptosis may diminish during the progress of the case. When present these symptoms generally start on one side, and develop in the other, one to six days later.

There may be anesthesia, or ulceration of the conjunctiva, or opacity of the cornea.

The pupils may be normal, unequal, small and not reacting to light, dilated, dilated and not reacting, or medium dilation with only slight oscillation.

The fundus may be normal at first, later, papillary stasis, edema, atrophy, or optic neuritis. Absence of papillitis or swelling has been observed. Difficult to determine, vision may be good or there may be complete blindness. W. R. P.

The Advantage of Paraffin as an Embedding Material in Eye Pathology.

POLLOCK, W. B. INGLIS (*Ophthalmic Review*, September, 1908). The author refers to the valuable paper on the pathological examination of the eyeball by Devereux Marshall that appeared in *The Royal London Ophthalmic Hospital Reports*, Vol. xlv. He then calls attention to the popularity of celloidin, but thinks its advantages do not compare with those of paraffin when the whole eye is to be embedded.

In speaking of the advantages of paraffin he says, "it holds all the parts together, so that there is no fear of getting them disturbed after cutting" quite as well as does celloidin, but the method of fixing is of the greatest importance. When the microscopical examination of the lens is not important, he removes it either prior to the eye being placed in the paraffin bath or after the paraffin block has been placed in the microtome carrier.

If the eye is kept too long in the paraffin bath some distortion may occur. This is usually unimportant, but where it is desired to have a given point of the equatorial region included in the section, the eyeball should be bisected two to three millimeters to one side of it.

The removal of the paraffin from the section is accomplished by placing the slide in xylol.

Paraffin sections can be kept for an indefinite time between layers of paper on trays, while paraffin blocks are more easily stored than celloidin. Paraffin sections may be cut of extreme thinness, and it is unsurpassed for serial sections.

The method of procedure is given in full:

"After employing 5 per cent. formalin for a year I gave it up, and the following mixture has been in use during the last twelve months. It is derived from one given by A. Bolles Lee:

Picro-sublimate Formalin.

Mercuric chloride, 1 per cent. solution....	44 parts
Picric acid, saturated solution............	44 parts
Glacial acetic acid......................	10 parts
Formalin	2 parts

It has great penetrating power, and is of considerable rapidity of action. The nuclear stains are all well taken up, and there is a complete absence of fogging. The lens does not become too hard for paraffin sections. The disadvantage of this mixture is the opacity which it produces in the cornea and in albuminous fluids within the eyeball. The former prevents any examination of the interior of the specimen until it is opened. The half eyeball kept for the museum has not this drawback, as the picric acid dissolves out if several changes of fluid are employed before the specimen is put up in permanent form. The opacity of the albuminous exudates is the same as that which results from formalin and alcohol.

The eyeball remains 24 hours in the fixing fluid and is transferred after a short washing to 30 per cent alcohol. Adherent blood-clot should be removed at this stage. The globe is then passed through increasing strengths of alcohol at intervals of 24 hours until absolute alcohol is reached. I employ the following gradation: 30 per cent., 40 per cent., 50 per cent., 60 per cent., 70 per cent., 80 per cent., 90 per cent., and 95 per cent. When a rapid diagnosis is required the eyeball may be placed in 50 per cent. from the fixing fluid and advanced two stages in 24 hours. Small pieces of tumor, etc., are transferred to absolute alcohol.

The eyeball is bisected at the stage of absolute alcohol, according to the directions given by Marshall or Greeff, and one-half is laid aside for preservation, the other is placed for a second period of 24 hours in fresh absolute alcohol. The half eyeball, however, is first cut a second time to reduce it to a height of 5-8 mm. From the alcohol this slice is transferred to cedar wood oil for clearing. This is also taken in two stages of 24 hours each, fresh oil being used for the second; they may be shortened to 12 hours if necessary. I gave up xylol for clearing, as it renders the eyeball too brittle and the lens too hard. It causes, in addition, a certain amount of distortion, while the cedar wood oil is free from these disadvantages. From the cedar wood oil the specimen is transferred to paraffin. As a rule it is usually put in a bath of used paraffin, then into pure paraffin, and blocked from a final change into pure paraffin. The tissue lies 12-24 hours in the paraffin oven. All traces of cedar wood oil must be removed, since its presence produces a white, friable block, which is useless for section-cutting. I employ Grubler's paraffin, best quality, of 45° C., and 52° C. melting point. The first is almost sufficient in winter time, but during a greater part of the year a mixture of the two is required. During the summer the 52° C. is used alone, but in a recent subtropical heat-wave I had to add a little of 58° C. paraffin to it. The chief indication is to use a paraffin of as low a melting point as possible, and it must always be the best. Too soft a paraffin is indicated by the section collapsing during cutting: it is shown by the breadth of the sections being less than the breadth of the block."

The "Cambridge Rocking Microtome," 1900 pattern, is thought by the author to be the best for small eyes. For large eyeballs "de Grotts" is convenient.

For mounting the sections albumenized slides are used, the sections being left 12-24 hours for drying, xylol for 3-5 minutes. Wash in absolute alcohol. Pour over slide 5 per cent. solution of celloidin in equal parts of absolute alcohol and ether. Stand slide on end and allow to dry for a minute. Place in 80 per cent. alcohol for two minutes and transfer to water. To remove the picric acid place in a 10 per cent. watery solution of potassium iodide for a few minutes until all the yellow color is out. Wash in water and stain, if the tissue has not already been stained in bulk. Dehydrate in 80 per cent. followed by absolute alcohol. Clear in xylol, carbol xylol, or origan oil, and mount in Canada balsam.

The half eye for preservation is put in fluid preservatives, made after the following formula:

Potassium acetate.................	90 grammes
Glycerine	180 cc.
Formalin	20 cc.
Water	300 cc.

W .R. P.

Streptococcus Infection of Eyelids Treated by Antistreptococcus Serum.

Snell, Simeon (*British Medical Journal,* July 4, 1908). A man, aged 36, was admitted to the hospital with both lids of the right eye occupied by a large suppurating sloughing mass and with all the symptoms of marked general sepsis, probably due to the eyelids. These symptoms became worse, but following several injections of antistreptococcus serum improvement set in and continued until complete recovery ensued. W. E. B.

The Dangers of Calmette's Ophthalmo-Reaction.

Harrison, T. Butler (*British Medical Journal,* August 8, 1908). In the May number of the Journal the writer reported his conclusions that the reaction though sometimes obtained in the non-tuberculous and sometimes not obtained in the certainly tuberculous, was a useful aid to diagnosis and that if the eye used for the test was healthy there was no danger to be feared from a ½ or a 1 per cent. solution of tuberculin. Three of the cases quoted in that paper have since done so badly that he is now of the opinion that the dangers are very real, and that as the reaction is by no means conclusive it is hardly a justifiable method of diagnosis. In one case, as a result of the instillation of tuberculin, a typical tuberculous process was set up in a perfectly healthy eye, a central corneal ulcer developed, and the resulting nebula will considerably reduce the vision of that eye. He also gives similar experiences of other men. He has abandoned the method and is now employing injections of old tuberculin as an aid in diagnosis in doubtful cases of tuberculous nature.

W. E. B.

The Influence of Nystagmus in the Detection of "Fire Damp."

SNELL, SIMEON (President's Address, *British Medical Journal,* August 1, 1908). The president of the British Medical Association in his address before the association referred to his work in the domain of industrial diseases and especially to nystagmus so frequently observed among miners. After a review of the work done by the author in his investigations concerning the nature as well as the cause of miner's nystagmus, showing that the prominent cause of the oscillations of the eyeball is the weariness of the elevators induced by the constrained position of the body and eyes which the miner is compelled to assume whilst engaging in certain kinds of work, and that it is totally independent of the indifferent illumination. After this review he gives the results of more recent studies upon the detection of "fire-damp."

The ordinary method adopted for the detection of "fire-damp" in coal mines is by reducing the size of the oil flame of the safety lamp until the luminosity almost disappears, and the "fire-damp" then, if present, appears as a pale blue flame or "cap" above it, this "cap" being due to the presence of gas in the air. The amount of gas present can be approximately estimated by the appearance and dimensions of the "flame cap." The oil flame method does not clearly detect less than 2 to 3 per cent., but for some purposes it is desirable to recognize a smaller quantity even than 2 per cent. It will therefore be readily understood how necessary it is that with the ordinary methods, indications of the presence of gas should be at once recognized. The men upon whom rests the responsibility of determining whether gas is present in the mine or not are known as "deputies" or "firemen," and he has particularly noticed the presence of nystagmus among this class of workers. It was his opinion that the apparent dancing of the safety lamps which forms such a prominent symptom of miner's nystagmus would be a hindrance in the detection of the "cap," spoken of as indicating the presence of gas. He has investigated this subject among officials and deputies and conducted a series of experiments in his clinic with miners affected with this type of nystagmus. Forty-eight miners from various collieries were examined and their incapacity to detect a "gas cap" unless a dangerous amount of gas was present was very marked in all, so that his whole investigation clearly demonstrated to his satisfaction that a miner suffering from nystagmus is unreliable as a detector of the presence of gas in a mine. This shows the importance of a periodical examination of the eyes of officials whose duty it is to watch for the presence of gas. W. E. B.

Traumatic Enophthalmos.

Dunn, H. Percy (*The Lancet*, August 15, 1908). These cases may be divided into three classes: 1st, those in which there has been shrinking (sinking) of the eyeball in consequence of fracture of the bony wall of the orbit, really a displacement of the eyeball; 2d, those in which the eyeball has sunk owing to the cicatricial contraction of the orbital connective tissue resulting from inflammatory processes, a result readily understood; 3d, those in which the eyeball after a blow upon the ball itself or over the region of the orbit sinks more or less quickly without any apparent lesion. For this condition no explanation seems apparent.

There is no such thing as a typical case, as the signs are different in practically all cases. There are, however, certain constant changes, as follows:

1. Shrinking (sinking) of the globe.
2. More or less ptosis.
3. Narrowing of the palpebral.
4. Diminution of tension.

The second and third symptoms are in some sense mechanical, though paralysis of Müller's muscle may possibly in part at least account for them. The enophthalmos and diminution of tension are not so easily explained. The cases vary in the period of their onset, sometimes being immediate and in other cases only becoming apparent after some days; in their duration from a few days to a permanent condition and in their intensity. The pupil may be the seat of almost any functional change which it is possible for it to manifest. It may be contracted, dilated, responsive or not to light, and may or may not react to drugs. Paralysis of one or more of the external ocular muscles is somewhat frequent concomitant of these cases of traumatic enophthalmos. One or more of the muscles may be involved. There may be differences in degree of the loss of power, and they may or may not be permanent. The vision may vary between the normal and complete blindness.

Various theories have been advanced to explain the condition. Beer maintains that the shrinkage of the globe is due to absorption of the orbital cellular tissue and fat caused by lesion of the trophic peripheral nerves. Another authority claims that the symptoms are due to paralysis of the sympathetic, but he does not explain how lesion of the sympathetic produces enophthalmos. All these theories maintain that enophthalmos follows some disturbance of ocular innervation, some arrest of nutrition of the orbital, if not ocular, structures. As bearing upon this question he refers to the series of cases by Jonathan Hutchinson, Jr., in which by removal of the Gasserian ganglion in whole or in part, the innervation of the eye and orbit was almost entirely arrested, and yet in none of these cases, numbering 26, was there enophthalmos. This leads him to a study of the sympathetic branches supplied from the cavernous plexus and particularly to a study of the lenticular ganglion with its sensory motor and sympathetic nerve, which controls the nutrition of the eyeball and innervates the involuntary muscular fibers of the eye and the upper lid through its sympathetic root. He points out the similarity in symptoms between traumatic enophthalmos and paralysis of the cervical sympathetic, especially as regards the four chief signs concerned—shrinkage of the globe, partial ptosis, narrowing of the palpebral fissure, and diminution of tension. In explanation of why the shrinkage results from loss of sympathetic innervation, he refers to the presence of plain or unstriped muscular fibers in the septa of the orbital fascia or so-called check ligaments. These involuntary muscles are under the influence of the cervical sympathetic nerves. The loss of innervation to the check ligaments allows the eyeball to recede.

He concludes that traumatic enophthalmos depends not upon trophic nerve changes leading to absorption of the fat and connective tissue of the orbit, but upon disturbance of the sympathetic innervation of the eyeball probably commencing in the lenticular ganglion. The paralytic signs present are dependent upon the extent of the injury which the sympathetic nerve has received and the special fibers which have been involved. W. E. B.

The Treatment of Immature Cataract.

Smith, Henry (*The Lancet*, August 15, 1908). He shows that extraction of immature cataract by the capsulotomy method is hardly justifiable; that ripening procedures which he mentions specifically, puncturing the lens capsule with a needle, iridectomy with massage through the cornea and iridectomy with direct massage with some form of instrument, that these ripening procedures are either unsatisfactory or dangerous and that to wait for nature's maturing process is highly unsatisfactory and detrimental to the patient. His treatment of immature cataract is extraction of the lens in its capsule. The stage of immaturity at which he advocates operation is the stage at which it unfits its possessor for the performance of his ordinary duties. He then describes briefly his method of extraction. W. E. B.

Some of the Newer Operations Upon the Eye and Its Appendages.

Grimsdale, Harold (*Ophthalmoscope*, November, 1908). The author divides this comprehensive subject into five headings: Glaucoma, Cataract, Muscles, Eyelids, and miscellaneous.

In glaucoma the question of establishing a filtration cicatrix has lately been studied by Bettremieux, Herbert, and Lagrange. Bettremieux takes up a conjunctival flap, either down to the cornea or in the opposite direction, and then traverses the superficial layers of the sclera with a curved needle and, using this somewhat as a director or guard, excises the overlying sclera by repeated cuts of a narrow linear knife. This procedure does not open the anterior chamber. Herbert makes an incomplete sclerotomy with an opening into the anterior chamber only about 3 mm. long. He then turns the knife in the wound and enlarges the incision downwards into the anterior chamber. He then again turns the knife and completes the incision upward so that the sclera is divided completely under the conjunctiva, which latter is left intact. Finally, a small wedge-shaped piece of sclera is excised by cutting from the anterior chamber extremity of the incision outward under the conjunctiva nearer the cornea than in the first instance. This scleral piece is left in situ and is supposed to shrink, allowing filtration. The writer remarks that the procedures with the knife are difficult and that some bruising of the wound must follow the several turns. Lagrange makes an oblique incision through sclera and conjunctiva with a Graefe knife and excises a piece of sclera with a pair of curved scissors. He then does an iridectomy and replaces the conjunctival flap, which thus heals over the groove in the sclera. The author considers Lagrange's operation the best for combatting tension in chronic glaucoma.

The extraction of the lens in its capsule, as performed by Major Smith, has not met with universally favorable comment. The chief advantage claimed is the complete removal of the capsule, but this does not invariably do away with the chance of "after-cataract." The chief danger is loss of vitreous, and though Smith has reduced this to 6% no other operator has been so successful, some running as high as 30% (in a very much smaller number of operations it should be said). While the method may be used in selected cases, "it cannot be regarded as suitable for general ophthalmic practice in England."

A method of reclination proposed by Axenfeld is also described, also a method suggested by Dransart of suturing the tendon of a paralyzed muscle to the belly of another one. The author mentions a new operation by Okuneff for the relief of lacrimal obstruction. The anterior half of the inferior turbinate is removed, and then, with cutting forceps, the bony wall of the duct with the mucous membrane is removed. In this way the canal is connected by a short duct with the middle nasal meatus. The operation seems a good one where the obstruction is low down. E. S. T.

ABSTRACTS FROM GERMAN OPHTHALMIC LITERATURE.

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Further Favorable Experiences in the Treatment of Gonorrheal Ophthalmia of Adults With Bleno-Lenicet Ointment.

Adam, Berlin (*Muench. med. Woch.*, March 17, 1908, No. 11). Adam reports 13 such cases (cases already referred to in part in a previous abstract) treated with bleno-lenicet ointment. Ten escaped with intact corneas, one developed a leucoma adherens, two irregular epithelial defects, reducing vision 1/10-1/3.

The treatment was also efficacious in a case admitted with a large, deep corneal ulcer about to perforate. The ulcer speedily became covered with a mixture of lenicet and coagulated secretion, simulating a condition of marked infiltration. In this instance the crust separated spontaneoulsy, but in another it had to be curetted out. It it advisable, therefore, to resort to a 5 per cent ointment as soon as the secretion begins to diminish.

In the above case, in spite of the deep ulceration, only a delicate scar resulted with few new vessels.

He expects to give the drug a trial in the treatment of serpent ulcer. A. C. S.

Concerning a Case of Blenorrhea Treated According to Adam's Method.

SCHEUERMANN, Stuttgart (*Die ophth. Klin.*, May 5, 1908, No. 9). Scheuermann reports a case of specific ophthalmia in an eight-months-old child successfully treated with the bleno-lenicet ointment recommended by Adam (*Muench. med. Woch.*, No. 43, 1907, and No. 11, 1908).

The advantages noted were: rapid diminution of the purulent secretion, no corneal complications, no necessity for everting the lids, no applications or conjunctival flushings necessary.

The ointment so thoroughly covers the cornea that if employed before the cornea has become involved ulceration seems improbable. A. C. S.

Cytologic Findings in the Conjunctival Tubercular Reaction.

DIETSCHY, Basel (*Muench. med. Woch.*, June 16, 1908, No. 24). Dietschy arrives at the following conclusions from experiments conducted on 28 patients:

1. The microscopical examination of the ocular secretion resulting from the conjunctival tubercular reaction shows a leucocyte formula which varies in the course of the reaction in a typical manner and conforms to the conditions present in other acute inflammations.

For example, in the cases of certain pulmonary tuberculosis there was first a polynucleosis, followed, provided the inflammation did not immediately subside, by a gradual increase in the number of lymphocytes.

2. Of no importance is the occasional ocurrence of polynuclear leucocytes, as these may be present in the untreated eye. The tuberculin of itself does not seem to produce a chemotactic leucocytosis.

3. Of clinical interest is the fact that the conjunctival secretion may contain the cytologic characteristics even though a reaction cannot be demonstrated macroscopically. The "ophthalmo-cytodiagnosis" may, therefore, be considered as increasing the value of the ordinary conjunctival reaction.
A. C. S.

Concerning Ophthalmo-Reaction.

Wolff-Eisner, Berlin (*Muench. med. Woch.*, January 14, 1908, No. 2). Wolff-Eisner, the discoverer of the reaction, suggests substituting the term "conjunctival reaction" for the incorrect and misleading term ophthalmo-reaction. He then critically reviews recent articles by Mainini, Wieris and Günther, Klieneberger and Feer. He agrees with Mainini that the cutaneous reaction is indicative of latent tuberculosis, whereas repeated conjunctival tests are necessary to elicit this fact, a view proclaimed by Wolff-Eisner a week before the appearance of Mainini's article, a view which he believes must become the foundation of future investigations.

Klieneberger's objective conclusions correspond very closely with his own deductions, but he interprets them differently. Wolff-Eisner regards the method not applicable in the diagnosis of manifest, clinically determinable tuberculosis, but a method which becomes useful in conjunction with other clinical diagnostic tests. He also calls attention to the prognostic importance of a negative reaction, a fact overlooked by most investigators.

He criticizes Wieris and Günther for their consistent use of the term "Calmette reaction." The serious disturbances they encountered in a certain case he ascribes to repeated instillations, not to a preexisting conjunctivitis. Other severe reactions occurred because of the unusually strong tuberculin solutions employed.

The liability of producing a phlyctenular conjunctivitis, as Feer has intimated, is not to be ascribed alone to the conjunctival method, because phlyctenulae have also followed cutaneous inoculations In 500 cases Wolff-Eisner observed no harmful results from the conjunctival reaction.

Although in adults the conjunctival method is probably the more useful, inasmuch as inactive foci are not revealed, he thinks that both methods applied side by side, as has already been attempted by the author, will meet with the greatest clinical reward A. C. S.

Is the Chantemesse Ophthalmo-Reaction of Diagnostic Value in Typhoid Fever?

Kraus, Lusenberger, Russ, Vienna (*Wiener klin. Woch.*, No. 45, Nov. 7, 1907). The authors arrive at the following conclusions:

1. Extracts of toxic typhoid cultures, of paratyphoid bacilli B, of colon bacilli, and of diluted tuberculin (1-50, 1-100) instilled into the conjunctiva of healthy individuals, produce mild secretory reaction; rarely do inflammatory symptoms supervene.
2. The same extracts in typhoid patients and in patients ill with other diseases cause an inflammatory reaction which generally confines itself to the conjunctiva of the lower lid.
3. The ophthalmo-typhoid reaction of Chantemesse has as yet no place in the diagnosis of typhoid fever, the Grubler-Widal serum reaction still being the most exact diagnostic method. A. C. S.

On the Significance of the Ophthalmo-Reaction in Tuberculosis.

Damask, Vienna (*Wiener klin. Woch.*, January 23, 1908, No. 4). Damask concludes that—

I. The positive ophthalmo-reaction is indicative of a recent tuberculous infection; the findings in typhoid patients, howare to be interpreted more cautiously because of the coexisting general hypersensitiveness.

II. The negative reaction enables one to exclude a tuberculous lesion excepting: (a) Tuberculous cases under specific treatment for some time. (b) Cachectic or cavernous cases in which the clinical diagnosis is not difficult.

The ophthalmo-reaction is only then reliable when: 1. The eye is not subjected to mechanical irritants. 2. Only such preparations are employed which do not contain non-specific irritating substances. 3. Only two drops of a 1 per cent tuberculin (Pasteur) solution are instilled. 4. Instillations are alternately made in each eye at short intervals. 5. Isolated congestive manifestations of the plica are not considered of diagnostic value. A. C. S.

Critical Remarks on the Clinical Significance of the Ophthalmo-Tuberculin Reaction.

KLIENEBERGER, Koenigsberg (*Muench. med. Woch.*, December 24, 1907, No. 52). Klieneberger tested the effect of repeated instillations of 1 per cent old tuberculin in the same eye in 61 patients; 9 tuberculous, 6 suggestive and 46 clinically non-tuberculous cases. The time between instillations averaged 8-10 days.

In the third group of 46 cases, 36 (78 per cent) reacted positively to the second instillation. Twenty-eight of these had reacted negatively to the first instillation, the remainder only slightly. The intensity of the reaction consecutive to the second instillation was striking. While in the first two groups of cases a marked reaction occurred after the second instillation in only one case, in the last series 16 severe cases of conjunctivitis resulted, 5 of which were also associated with swelling of the lids, diffuse conjunctival hematoma and bulbar chemosis.

He regards these late reactions an evidence of hypersensitiveness and repeated instillations of tuberculin as advocated by Effenstein, Schenck and Seiffert, as misleading diagnostic methods. A. C. S.

Investigations Concerning the Ophthalmo-Tuberculin Reaction.

WIENS-GUNTHER, Breslau (*Muench. med. Woch.*, December 24, 1907). The authors made instillations of 1 per cent tuberculin solutions in twelve cases. In several cases considerable reaction (sub-conjunctival hemorrhages, purulent conjunctivitis, marginal keratitis, chronic catarrh) followed, and the authors considered it inadvisable to make any further instillations with 1 per cent tuberculin as recommended by Calmette .

Half per cent solutions were employed in thirty-eight cases, the results being more favorable. In all the non-tuberculous cases negative results were obtained excepting one, where instillations were made in an eye with slight conjunctival irritation. In this case a most acute reaction ensued, characterized not only by conjunctival manifestations, but by the occurrence of a marginal keratitis. Recovery in two weeks. Before making the instillations, therefore, the conjunctivae should be thoroughly inspected.

Because of the few cases examined, they are unable to make any positive statement regarding the diagnostic value of the Calmette reaction.

The reaction when it occurred always exhibited the same characteristic appearances. The inflammation as a rule confined itself to the lower palpebral conjunctiva, which became hyperemic, swollen and assumed a glassy aspect. A more or less marked fibrinous exudation followed. The more severe reactions presented in addition involvement of the lower bulbar and scleral conjunctiva, subconjunctival hemorrhages usually above the cornea and under the upper lid, typical phlyctenular eruptions along the limbus, and a scrofulous form of keratitis.

Wieris and Günther consequently are of the opinion that the Calmette reaction is not so harmless as generally supposed.

A. C. S.

Practice Notes.

RICHTER, Hamm (*Die ophth. Klinik,* February 5, 1908, No. 3). Stimulated by Vüller's investigations, Richter has tried the Sachs transilluminator in a large series of cases and has become convinced that defects in the iris pigment layer occur much more frequently than was formerly supposed. The dazzling sensation accompanying lacerated wounds he repeatedly found associated, even where the iris appeared normal, with extensive defects of the pigment layer.

In one case the usual tests revealed only two small adjoining peripheral iris detachments, whereas transillumination demonstrated a large defect in the pigment layer, divided only by a narrow band of iris stroma. Vüller made a similar observation.

The Sachs lamp also was of great assistance in locating a foreign body in the angle of the anterior chamber.

Traumatic iris granuloma. This condition associated itself with a foreign body on the cornea. Directly behind the corneal injury a flocculent formation on the iris was noticeable; a perforation of the cornea, however, could not be demonstrated. Twenty-four days later the eye again became inflamed. The iris was now hyperemic, the flocculent deposit more nodular and vascularized. At the end of four weeks speedy retrogression occurred, there was absorption of the nodule, an iris cicatrix resulting, causing slight retraction of the pupillary margin. No alteration was discernible in the pigment layer. Syphilis and tuberculosis could be excluded. A. C. S.

The Subconjunctival Aseptic Abscess as a Cure of Ulcus Serpens.

Ferentinos, Patras, Greece (*Die ophth. Klinik,* March 5, 1908, No. 5). The writer experimenting with paraffin oil mercuric iodide mixture found that the mixture in the following proportions—paraffin oil mixture, 1 part (mercuric iodide 1, paraffin oil 2,000); vaseline oil, 2 parts—if injected subconjunctivally, acted very favorably in cases of ulcus serpens.

Having cocainized the eye, two graduations of a Pravaz syringe containing the mixture are injected under the conjunctiva near the limbus. The injection of larger quantities causes rather a severe reaction.

One injection usually suffices. A subconjunctival aseptic abscess forms which is not evacuated. Conjunctival instillations of the mixture and applications to the ulcer are made use of simultaneously in many cases. The subconjunctival method, however, has of itself resulted in a cure.

Atropine is generally necessary and evacuation of large hypopyons is desirable. A. C. S.

On the Dark Sense.

Ferentinos, Patras (*Die ophth. Klinik,* April 5, 1908, No. 7). *Recapitulation.* The dark sense signifies the consciousness of visual rest. It signifies not the failure to perceive the existence of light (negative scotoma, blind spot), but the knowledge of its non-existence (positive scotoma).

It is subject to the same conditions as every other sensation, its generation being dependent upon a communication between sense organ and soul; just as the development of every other sensation necessitates projection of the stimulus conveyed to the brain, so in the generation of the dark sense, projection of the stimulus from the soul is necessary. The origin of the stimulus, which in this instance is light absence, is located in the perceiving membrane, in the rods and cones of the retina. Reasoning thus, the inability of the successfully operated congenitally blind to recognize objects must be ascribed to the incapacity of the soul to project accurately the afferent stimulus, not to a torpor retinae.

The same explanation may hold for the exclusion of the false image, the soul purposely suppressing the stimulus, thereby preventing projection. A. C. S.

Ocular Disease Due to Artificial Fertilizers.

Bondi, Iglau (*Muench. med. Woch.,* April 14, 1908, No. 15). Bondi reports a case of acute, bilateral ocular inflammation, the result of accidental introduction into the conjunctival sacs of Chili saltpetre.

There was marked swelling and redness of the lids, ulceration of the lid margins, congestion of the tarsal, and bulbar conjunctiva, and ciliary injection. In one eye, a greyish infiltration occurred in the upper corneal region. The disease ran a favorable course, only a faint central macule resulting in the one eye.

The only other case of similar etiology on record is Augstein's case published in the *Klinische Monatsbl. f. Augenh.,* December, 1907. In this case hyperphosphites, kainit, and Thomas slag were the fertilizers employed, and vision was almost completely destroyed.

Augstein concluded from this and from experiments conducted on rabbits' eyes, that the hyperphosphites were especially and perhaps the only fertilizers liable to injure the eye.

A. C. S.

Several Cases of Vaccine Infection of the Eye.

Tertsch, Vienna (*Wiener klin. Woch.,* January 9, 1908, No. 2). During the smallpox epidemic in Vienna, 1907, the writer observed nineteen cases in the Fuchs' clinic. The history of one case of unusual interest is recorded in full. The patient, a ten-year-old boy (unvaccinated), was infected during attempts at removal of a foreign body by his mother and sister, both of whom had been vaccinated on the arm several days previously. An acute, unilateral, conjunctival infection ensued with lid edema, swelling of the face and temporal region, and enlargement of the preauricular gland.

There was a general distribution over the bulbar and tarsal conjunctiva of pin-head to pea sized greyish-white spots, slightly elevated and with ragged edges. On removal of the greyish superficial deposit, the spots resolved themselves into rather deep ulcers with bleeding bases. Coalescence of these areas was not infrequent.

Similar ulcerations occurred on the lid margins. The foreign body was found in an ulcer of the upper tarsal conjunctiva. At no time were typical vesicles or pustules noted. The corneal involvement which occurred on the eighth day closely simulated in appearance the conjunctival lesions. There was at first a greyish-white exudate on the upper portion of the cornea, which was followed by a flat superficial ulcer resting on an opacity in the deeper corneal layers, an opacity composed of delicate, striated and punctiform confluent greyish-white spots.

The cornea probably became infected by contiguity, there being a large adjoining conjunctival lesion. The deeper infiltrations may be interpreted as a secondary reaction inflammation, etiologically similar to keratitis post vaccinulosa, but differing in appearance. At the end of several weeks only a faint opacity was discernible.

In sixteen other cases, typical ulcers formed on the lid margins without conjunctival or corneal complications. In two others there was a whitish exudate with notched edges on the caruncle and semilunar folds distributing itself over the adjacent conjunctiva and skin.

While all these terminated favorably, he mentions one where shortening of both lids and destruction of the cilia followed. Of the nineteen cases only four were produced by auto-infection. A. C. S.

Serum Therapy and the Metallic Ferments in Ophthalmology.

Darier (*Die ophth. Klinik*, No. 11 and 12, 1908). Darier, Paris, considers the simple antitoxic, non-specific serum therapy an important constituent of general therepeutics and prophylaxis in all constitutional and local infections. The serum most easily obtained and most deserving of confidence is the Roux-Behring diphtheria curative serum.

He recommends injections of the serum in pseudomembranous conjunctivitis, in conjunctivitis and keratitis of pyogenic origin, in gonorrheal conjunctivitis, hypopyon keratitis, traumatic irido-cyclitis and post-operative infections, also as a prophylactic in operative and traumatic cases.

He usually makes three injections of 10 cc. serum on three successive days. The results following accidental injection of tetanus serum were found to be equally good. Darier believes that the active immunity produced by injections of these virulent toxins in animals leads to an antitoxin which, injected into the human organism, assists in combating infections of most diverse etiology.

He, however, does not consider it justifiable to rely solely on serum therapy, but believes efficient local treatment a necessary adjunct. In septic ulcers, panophthalmitis and post-operative septic complications he believes in starting treatment with the serum injections, these to be followed by a series of intravenous injections of collargol; in fact, he usually resorts to collargol injections when the results obtained with the serum therapy do not seem permanent or when a tolerance to the antitoxin seems to be developing. A. C. S.

Old Foreign Body in the Superior Maxilla as a Cause of the Sudden Onset of An Acute Conjunctivitis Simulating Purulent Conjunctivitis.

THOREY, Düsseldorf (*Muench. med. Woch.*, December 3, 1907, No. 49). Patient consulted the clinic on account of a sudden purulent discharge from the left eye. Secretion was profuse and out of proportion to the rather moderate conjunctival injection. A rhinological examination was, therefore, resorted to, which revealed the presence of a metallic foreign body firmly wedged in the left nasal cavity. X-ray photographs, copies of which are contained in the article, located the foreign body (knife blade) in the left orbit, antrum and nasal fossa and in the nasal septum.

The patient then remembered that four years ago he had received a stab wound near the left eye, resulting in a still visible cicatrix along the inner orbital margin. There was also thickening of the underlying bony rim and attachment of the lower conjunctival fornix to a swelling beneath the globe. The conjunctiva was perforated by a minute fistulous tract through which the foreign body could be palpated. The blade, which measured 5.3 x 1.3 cm., was removed through an incision made several mm. below the lower orbital rim. Within twenty-four hours the conjunctival discharge had completely disappeared, wound closure without disfigurement eventually resulting.

In all likelihood the fistula was produced by rupture of an abscess into the conjunctival sac, there being no history obtainable of any conjunctival traumatism. Similar cases reported by Steckis, Kirchgässer and Genth did not end so favorably.

In old injuries near the bony fossae one should, therefore, always examine those fossae for foreign bodies. The author's case again emphasizes the importance of a nasal examination in uncertain ocular affections. A. C. S.

Vinegar Burn of the Eye.

Kramer, Vienna (*Wiener klin. Woch.,* December 19, 1907, No. 51). Krämer reports a case of acetic acid burn of the eye. During an attack of syncope, vinegar was freely applied to the face, some of the acid accidentally getting into one eye. The vinegar had been prepared from an essence, presumably diluted 10-20 times.

Corneal haze and iritis followed. The iritis became chronic and associated itself with a relapsing form of corneal erosion. Recovery in five months. (Wicherkiewicz has reported a very similar case.)

Analysis of the vinegar essence yielded 90 per cent glacial acetic acid. The writer then made instillations of solutions of acetic acid into guinea pigs' eyes, starting with the officinal acetic acid containing 6 per cent glacial acetic acid. While the weaker solutions produed temporary corneal hazes, a 9 per cent solution caused a longer lasting corneal opacity and disturbances of the corneal epithelium. A. C. S.

Concerning Atropine Poisoning.

Lesshafft, Gorlitz (*Die ophth. Klinik,* March 20, 1908, No. 6). Lesshafft reports two cases of severe atropine poisoning. The first terminated fatally. The patient was a girl aged 11 years, who had taken by mouth 6 cc. of an .8 per cent solution of atropine sulphate. Characteristic symptoms of atropine intoxication followed. Treatment was not begun until one and one-half hours later.

The second patient, a woman of 22 years, had taken 3 cc. of a 1 per cent solution of atrop. sulph. The case was interesting because of an early central amblyopia, increased patellar reflexes, little disturbance of the mucous membranes, and because the diagnosis had to be made by exclusion. The diagnosis was verified by instilling the concentrated filtrate of the gastric contents into a cat's eye. In doubtful cases, this test should always be made; if necessary instillations can be made in the human eye. Vitali's test was positive.

In the cases of atropine poisoning reviewed by Fedderson in 1884, he found a mortality of 11.7 per cent. Cases since reported by Selle, Demme, Hoffmann, Rudolph, Binz and Kratter, including the two cases described by Lesshafft, resulted in a mortality of 11.1 per cent. A. C. S.

An Opto-Spherometer.

Wolffberg, Breslau (*Wochensch. f. Ther. u. Hyg. d. Auges*, August 13, 20, 27, and September 3, 1908, Bd. xi, S. 363, 371, 379 and 387), describes a new instrument for the approximate measurement of spherical, cylindrical, prism and combined lenses. Starting from the fact that the movement of lenses produces apparent movement in the object viewed, the author makes use of the amount of displacement of the object to determine the strength of the lens. Four factors are necessary: (1) An object. (2) The distance of the object must not be too great or too small. (3) The test glass must be 25 cm. from the eye, any hyperopia present being corrected. (4) The test glass is round and of a diameter of 35 mm. With these conditions fulfilled, the author is able to determine the strength of any combination of lenses by means of his optometer. C. L.

Greenish Discoloration of the Cornea.

Senn, A. Wil (*Wochensch. f. Ther. u. Hyg. d. Auges*, September 17, 1908, Bd. xi, S. 403), dissents from Salus's belief that a case of greenish discoloration of the cornea was due to multiple sclerosis, which caused trophic changes and destruction of the hemoglobin of the corpuscles, the resulting pigment of staining the corneal tissue. Senn regards it as rather a case of anilin dyeing of the parenchyma of the cornea. C. L.

Cerobrospinal Meningitis.

Cohn, Posen (*Med. Klinik,* No. 33, 1908, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* September 10, 1908, Bd. xi, S. 396), says that the reaction of the pupil to light was at first normal. As the case grew worse, it became slower, at last disappearing entirely. The muscles frequently became paralyzed in the 2-3 week, though this frequently disappeared if the patient recovered. C. L.

The Influence of Pregnancy and Birth on Ocular Disease.

Fejer (*Budapesti Orvosi Ujsag,* 1908, No. 5, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* September 10, 1908, Bd. xi, S. 397) reports the case of a woman who had excessive myopia and chorioretinitis centralis which became rapidly worse at every pregnancy. As a result, abortion was twice performed upon the advice of physicians. Another woman aborted in consequence of influenza in the sixth month of pregnancy. She had edema of both lids, chemosis of the conjunctiva and choked disc. The author diagnosed thrombosis of the cavernous sinus. C. L.

Amaurosis of Pregnancy.

Holzbach (*Centralbl. f. Gyn.,* 1908, No. 21, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* September 10, 1908, Bd. xi, S. 398). The obstetrician occasionally has cases of bilateral blindness due to icterus gravidarum, uremic amaurosis, and the amaurosis of eclampsia. Rarer is neuritis optica caused by the pregnancy alone. It is caused by an interstitial inflammation of the nerve, and leads gradually to atrophy and blindness. The typical features of neuritis optica egravidate are its beginning before or about the middle of pregnancy, the bilateral nature, its becoming worse as pregnancy proceeds, the atrophy, especially when it starts as a retrobulbar affection. It is prognostically important that the disease ceases to progress as soon as pregnancy is interrupted, and if the nerve has not suffered too much, the prognosis as to sight is good. C. L.

The Position of the Oculist in Regard to the Ophthalmo-Reaction.

SCHULTZ-ZEHDEN (*Therapeut. Monatshefte,* April, 1908, Abst. in *Wochensch f. Ther. u. Hyg. d. Auges,* June 11, 1908, Bd. xi, S. 292) claims that the injury to the eye following the use of the ophthalmo-reaction is due to the preparation being too strong or qualitatively unsuitable. He has found that the old tuberculin in 1 per cent solution is tolerated by nearly every eye. He did not see a case of permanent injury in 150 cases.

C. L.

The Value of the Conjunctival Reaction, Especially in Cutaneous Tuberculosis.

REICHMANN (*Med. Klinik,* Nov. 17, 1908, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* June 11, 1908, Bd. xi, S. 292) believes that this test, in spite of its simplicity, is not adapted for the general practitioner, since the patient should be kept under careful observation. Its clinical value is unquestionable.

C. L.

Epidemic Meningitis.

MATTHES (*Med. Klinik,* Nov. 20, 1908, Abst. in *Wochen. f. Ther. u. Hyg. d. Auges,* June 12, 1908, Bd. xi, S. 302) found frequent paralysis of the abducens and motor oculi accompanying cerebro-spinal meningitis, and still more frequently strabismus concomitans. There were, also, dilation and rigidity of the pupil, miosis, and inequality. No fundus changes except engorgement of the veins, and one case of choked disk.

C. L.

Phosphene

OHLEMANN (*Wochensch. f. Ther. u. Hyg. d. Auges,* June 25, 1908, Bd. xi, S. 307) reviews the theories in regard to the origin of the phenomenon of phosphene, and describes a circular phosphene which occurred in a case of exophthalmic goitre. It occurred at the height of the disease, when the tension and pressure was greatest, and was present only in the dark, as when the patient awoke at night. It was radiating and circular, resembling the corona radiata. It was caused probably by mechanical irritation of the retina.

C. L.

The Influence of the Eye on the Malpositions of the Spinal Column in Childhood.

KANN (*Das Kindesälter*, H. 3, 1908, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* July 2, 1908, Bd. xi, S. 321) thinks that refractive errors influence the deviations of the spinal column from the normal, and urges an examination of the eyes of children suffering from such deformities. C. L.

Hereditary Nystagmus.

CASPAR, L. (*Centralbl. f. prakt. Augenheilk,* July, 1908, Bd. xxxii, S. 199), reports the following case: The grandmother had normal eyes, all of her four daughters had normal eyes. The oldest daughter had one son with normal eyes, three sons with nystagmus and four daughters with normal eyes, one of the latter having a daughter with normal eyes. The second daughter had two sons with nystagmus and five normal daughters, one of whom had a normal son. The fourth daughter had five normal daughters and one normal son. The author suspects a hereditary syphilitic factor. C. L.

Representations of Curing Blindness Found on Ancient Sarcophagi.

GREEFF, R., Berlin (*Centralbl. f. prakt. Augenheilk.,* August, 1908, Bd. xxxiii, S. 225), refers to the statements in the New Testament descriptive of the healing of the blind by Christ. But this theme is found specially elaborated on many sarcophagi dating from the early years of the Christian era. C. L.

Treatment of Vernal Catarrh.

ZIRM, E., Olmütz (*Wochenschrift f. Ther. u. Hyg. d. Auges,* July 30, 1908, Bd. xi, S. 347), advises that dark glasses be worn and all irritant applications to the eyes be avoided. Good results have been obtained by the use of cold applications to the eyes, and also to the whole body. He uses instillations of adrenalin solution twice a day, and in the intervals, also twice a day, introduces into the conjunctival sac an ointment of sol. sublimat. (1:1,000) 4.0; vasel. flav. amer. 20.0. C. L.

Circumscribed Atrophy of Facial Fat.

STRASBURGER, Bonn (*Mediz. Klinik,* 1908, No. 26, Abst. in *Wochenschrift f. Ther. u. Hyg. d. Auges,* July 30, 1908, Bd. xi, S. 348), describes a condition following fracture of the base of the skull where all the fat of half the face disappeared, accompanied by enophthalmus and miosis. There was probably a lesion of the sympathetic. C. L.

The Atropin Treatment of Myopia.

SCHULTZE-ZEHDEN, Berlin (*Mediz. Klinik,* 1908, No. 29, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* August 6, 1908, Bd. xi, S. 358), found in a number of cases that prolonged use of atropin and rest of the eyes checked progressive myopia and even allowed the patient to wear a glass from 1D to 1 1/2D weaker. C. L.

The Diagnosis of Cranial Abscess.

LEWANDOWSKY, Berlin (*Mediz. Klinik,* 1908, No. 27, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* August 6, 1908, Bd. xi, S. 358), describes a case of right-sided ptosis, which was due to a brain abscess in the right temporal lobe, which pressed upon the motor oculi. C. L.

Double Homonymous Hemianopsia.

GEISSLER, Heilbronn (*Würt. med. Korresp.*—Bl. 4, 1908, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* April 30, 1908, Bd. xi, S. 243), presented a patient who claimed that he saw "half-sided" when he awoke August 14, 1905. Examination by Dr. Boehm at that time found homonymous hemianopsia without hemianopic pupillary rigidity; i. e., the lesion was central. May 11, 1906, he had another attack resulting in homonymous hemianopsia of the other side, leaving only central vision. There was no pupillary rigidity. There was no choked disk or optic atrophy. The lesion must lie in the visual centers, probably due to hemorrhage or embolism.

Shortly after the patient was demonstrated, the last hemianopsia disappeared, but a hemiplegia supervened, followed by death with the symptoms of brain tumor. C. L.

Lesions of the Eye Caused by Artificial Manure.

Sommer, Mayer (*Wochensch. f. Ther. u. Hyg. d. Auges,* April 30, 1908, Bd. xi, S. 245), again calls attention to the danger of the eyes of persons handling artificial manure, although only three cases have been reported; the easy solubility of the minerals in the sweat of the hands and subsequent rubbing of the eye makes the danger very great. C. L.

Sophol in Ophthalmology.

Bock, Laibach (*Wochensch. f. Ther. u. Hyg. d. Auges,* May 7, 1908, Bd. xi, S. 249), regards the instability of sophol in the presence of light and air as a serious drawback. It is used as a prophylaxis against blennorrhea neonatorum, in strengths of 5 per cent and upwards. The secretion immediately becomes less, and there are never any signs of irritation. This allows repetition of the remedy at short intervals. The remedy may be used in any form of conjunctivitis, even in trachoma, with good result. C. L.

Greenish Discoloration of the Cornea in Multiple Sclerosis.

Salus (*Mediz. Klinik,* Nov. 14, 1908, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* May 14, 1908, Bd. xi, S. 259) reports a case, the fourth of its kind, of a circular greenish-brown discoloration of the corneal margin, most pronounced at the limbus, gradually becoming less evident and fading away, without a sharp margin, into the clear corneal tissue. The condition was symmetrical in both eyes The patient had multiple sclerosis. The cause of the discoloration is probably changes in the vessel walls and secondary diffusion of blood, following trophic disturbances of innervation. C. L.

Electrolysis in Diseases of the Tear Passages.

Oliveres, A. (*Hojas Mens. d. Oft.,* Bd. i, H. 1, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* May 14, 1908, Bd. xi, S. 259), describes the method as follows: After the canaliculus is slit, a No. 1 probe is introduced and a current of 4 m.a. is allowed to pass for 5 minutes. A few treatments suffice for the early stages of the disease. If there is a mucous secretion, a No. 3 probe should be used. If there is suppuration, 5 m.a. may be used, after washing out of the sac. The current is gradually increased for one minute until it reaches 4-5 m.a, (never over 5 m.a.), allowed to remain at its height for 3 minutes, and in 5 minutes is reduced to zero. C. L.

Results of Photometric Examination of Schools.

QUISSFELD, RUMBURG (*Prag. med. Wochensch.*, Nov. 13, 1908, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* May 14, 1908, Bd. xi, S. 262), comes to the following conclusions in regard to school buildings:

1. They should stand north, northeast or northwest.
2. They should lie as high and open as possible.
3. They should have large windows, reaching to the ceiling, with a glass surface of 1.5.
4. They should have a depth of room of not more than double the height of the window, so that the light may fall direct on each place.
5. Very small window-bars.
6. Smallest amount of wood in the window frames.
7. The most practical position of the teaching-room on that floor.
8. The curtains should be light-gray, and very translucent, so that only the direct sunlight is shut off.
9. The walls should be white or gray and no objects should be on them.
10. No plants should be in the windows.
11. A succession of objects for instruction in the class room, with direct and permanent sunlight, under special care for the children's work, in order to avoid even the best curtains.

C. L.

Double Perforation of the Eyeball by a Pocket-Knife, with Implantation of a Cilia and Epithelial Germ Cells in the Scar on the Posterior Wall of the Eye.

WARNECKE (*Centralbl. f. prakt. Augenheilk.*, June, 1908, Bd. xxxii, S. 161) saw the patient two hours after the injury. The right eye was collapsed and intensely injected. In the equator was a horizontal, gaping wound, beginning at the nasal corneal margin, runing temporally above the cornea, for a distance of 2-3 mm. The anterior chamber was full of blood, but it could be seen that the sphincter iridis had been cut, without prolapse of the iris. Vision: perception of light; projection good.

Although the prognosis was bad, an attempt was made to preserve the eye by putting a silk suture through the conjunctiva and episclera, which closed the corneal wound.

At first the result was very good, but later on the prognosis became bad and in about a month there was increased tension, requiring enucleation. Examination of the ball showed in addition to the anterior perforation a second one, 5-6 mm. long at the posterior pole of the eye, near the disk. This area projected forward in a vesicular form. Microscopically, the chorioid of this area showed peculiar polypi formations. In one of these was found the central end of a cilia with an island of epithelium, the whole surrounded by connective tissue. C. L.

Visual Disturbances Following Hemorrhage.

Proell (*Mediz. Klinik,* Nov. 13, 1908, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* May 21, 1908, Bd. xi, S. 269). About two hundred cases have been reported in the literature. The author's case was a girl of 16 years who suffered from an almost complete and permanent blindness, following an unexplained metrorrhagia. She had a choked disk, which is very rare. The treatment is restoration of fluid to the body and later on strychnia and galvanism. C. L.

Traumatic Hysteria.

Augstein (*Zeitsch .f. Bahn-und Bahnkassenärzte*, Nov. 5, 1908. Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges*, May 21, 1908, Bd. xi, S. 271) finds that differences in the pupils accompanied by increased knee-jerks, and increased pulse rate are valuable objective signs of a nervous constitution. They are of value both in traumatic neuroses and otherwise. They may or may not be accompanied by a very red disk, whose significance is still undetermined.

In opposition to a pupillary difference with well retained reaction to light, there is the ominous significance of absence of light reflex or slow reaction By this symptom, the author was enabled frequently to diagnose artificial tabes. C. L.

The Treatment of Anchylostomiasis.

SCHILLING (*Therap. Monatsch.*, April, 1908, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* May 28, 1908, Bd. xi, S. 274) regards the amaurosis which has followed the use of Filix mas as due to an impurity and not to the drug itself. Nor should the use of castor oil be held responsible as the animal experiments prove nothing as far as man is concerned. C. L.

The Cure of Pannus Trachomatosus by Infecting with Blennorrhea.

GOLDZIEHER, W. (*Pester Medizin.-chirurg. Presse,* No. 15, 1908, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* May 28, 1908, Bd. xi, S. 276). The therapy of an advanced pannus is a difficult one The best methods are galvano-cauterization and the so-called circumcision, or excision of a strip of conjunctiva parallel to the cornea. Jequirty, which was once popular, then given up, is again coming into favor since the active principle has been isolated and is furnished in four strengths.

The author refers to the old treatment of pannus by means of infection with gonococci, and describes a case which was thus treated, after all other methods had failed. After the severe reaction had subsided, vision had returned to the eye. The cornea was clear, and even the conjunctiva was free from trachoma. C. L.

The Simplest Electric Ophthalmoscopic Lamp.

DAXENBERGER, F., Regensburg (*Wochenschrift f. Ther. u. Hyg. d. Auges,* June 4, 1908, Bd. xi, S. 281), describes his lamp. It is a frosted, twenty-five candle power, tantalum lamp. It gives a comparatively large light surface, with a softened, white, even light. The color differences in the fundus are well made out. C. L.

An Anatomic Examination of a Case of Atoxyl Blindness.

NONNE, M. (*Mediz. Klinik,* 1908, No. 20, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* June 4, 1908, Bd. xi, S. 282).

The patient had died of carcinoma. The blindness, as is usual in such cases, appeared as a part of a general intoxication, and discontinuance of the drug caused no amelioration of the symptoms. Anatomically, there was a retrobulbar neuritis of a subacute degenerative character. C. L.

Neuritis Retrobulbaris.

Rethi (*Mediz. Klinik,* No. 16, 1908, Abst. in *Wochensch. f. Ther. u. Hyg. d. Auges,* June 4, 1908, Bd. xi, S. 284) presented a case of retrobulbar neuritis following ethmoidal disease, which in the left eye had gone on to almost total blindness. Evacuation of the ethmoid through the nose was followed by almost immediate improvement in vision, and after a sweat-cure the vision of the right eye was almost completely restored, while that of the left was much improved. C. L.

Communication Concerning the Last 500 Cases of Extraction of Senile Cataract, With Especial Reference to the Complicated Cases.

Haessig-Beda, Basel (*Zeitschrift f. Augenheilkunde, Erganzungsheft,* Band xix, 1908). The author's five hundred cases are a continuation of the report by Prof. Schiess of eleven hundred extractions, and of four hundred reported by Hallauer from the Basel University Eye Clinic.

Much attention is paid to the preparation of the patient previous to operation. The conjunctiva, the lachrymal and the nasal passages are frequently examined and pathologic conditions are treated. The urine is always examined.

The patients are exercised daily in turning the eye downward, the nurse meanwhile separating the lids with the hand. The exercises enable the surgeon to lay aside the fixing forceps as soon as the counter-puncture is made.

For several days previous to the operation a moist boric acid dressing is tied to the eye and repeated every night until no secretion appears on the dressing in the morning, and until the bandage is not displaced at night. In this way latent inflammations of the conjunctiva or lachrymal apparatus are made manifest.

The author cites a case in which the patient developed a serious erysipelatous inflammation about the eye after the eye had been bandaged over night. He believes that the erysipelas was hastened by the bandage, whereby the disease was developed before the extraction was made, perhaps saving the eye. The patient becomes accustomed to sleep with a bandaged head.

The surgical instruments (with the exception of the knives) are placed for 20 minutes in a 3 per cent solution of carbolic acid, and then they are placed in a boric acid solution until used. The knives are placed in concentrated alcohol for 15 minutes or until used.

Gauze sponges are dipped in 1/2500 bichloride solution. The cotton of the dressing is dipped in hot boric acid solution, while the gauze in contact with the wound is sterilized by superheated steam.

The operations are performed in the operating room, which is in the Parterre. The male patients are located on the first floor, and the female patients on the second floor. As the clinic possesses no lift, the patients are slowly led by two assistants up the steps, with no serious results.

For anaesthesia, a 2 per cent solution of cocaine is used. The fixation forceps is removed as soon as the counter-puncture is made. A conjunctival flap is not made intentionally.

An iridectomy is always employed. Flushing of the anterior chamber for removal of cortical masses was formerly the rule, but is now used less frequently. A skillfully applied bandage, without pressure, is important. The second eye is closed with adhesive plaster for 48 hours. The dressings are changed every 24 hours. The dressing for the first 24 hours is moistened with a weak carbolic solution every two hours. After the eighth day the patient is permitted to use dark glasses in the day time, the eye being bandaged at night.

In the first hundred cases bad results were due as follows: In two cases practical blindness resulted from a subacute inflammation of the uveal tract. In one case poor sight resulted from much remaining cortical material, and in three cases there had been previously chorioiditis degenerativa, and optic atrophy.

In twenty-six of these cases the extraction was made without iridectomy, and in fifty-five cases combined with iridectomy. In nineteen cases a preliminary iridectomy had been made.

In the second hundred cases, forty-six cases were operated with iridectomy, and in fifty-four cases after preliminary iridectomy. In ninety-five cases the result was good (11/200 or more). One eye was lost through purulent iridocyclititis.

In a second case the vision was 7/200, due to inflammation of the uveal tract, and in another there was retinal detachment due to loss of vitreous (vis. 4/1000). Remains of cortical masses caused poor vision in two cases.

In the third one hundred cases, preliminary iridectomies were made in sixty-nine cases, and in 31 cases extraction was done with simultaneous iridectomy. In this series a good result was obtained in 98 cases, one eye being lost through chorioidal hemorrhage and a second had poor vision, due to cortical masses.

In the fourth series one case was operated upon by simple extraction, 17 cases with iridectomy and in 2 after preliminary iridectomy In 94 cases a good result was obtained; poor vision resulted in four cases, due to cortical remains, and in two cases caused by previous complications.

In the fifth series preliminary iridectomy was performed in 90 cases, iridectomy in 9 cases and simple extraction in one case. Good results were obtained in 92 cases. Poor sight resulted from cyclitis in one case, cortical remains in four cases, and previous complications in three cases.

Comparing the results in the above five hundred cases with the previously reported fifteen hundred cases it is found that there has been a progressive diminution of the cases of panophthalmitis, which in the last five hundred cases was never encountered. In the first 500 cases (1865 to 1878) it occurred twenty-four times.

Similarly severe uveitis, probably also due to infection, occurred forty-nine times in the first series of 500, and in but six in the last.

The lessened number of cases of prolapse of the vitreous the author attributes to the abandoning of the Graefe linear extraction and the use of modified extraction, as well as the removal of all outside pressure (speculum, forceps, etc.) during the extraction of the lens.

Prolapse of the iris occurred in 25 per cent of the cases of extraction without iridectomy, in 1.9 per cent of the cases of simultaneous iridectomy, and in 6.9 per cent cases of preliminary iridectomy.

The author believes that preliminary iridectomy is the preferable mode of operation. He thinks that the wearing of a mask or wire shield is apt to become dangerous through displacement. F. K.

Harmful Results of the Calmette Reaction and Their Prevention.

SELIGMANN, S., Hamburg (*Zeitschrift f. Augenheilkunde,* August, 1908, Band xx, Heft 2). Six to twenty-four hours after the instillation of the tuberculin the conjunctiva is reddened. A further degree is reached in some cases, resulting in a greater redness, and excretion of fibrin and mucus. The third degree is characterized by chemosis of the conjunctiva, with occasionally subconjunctival hemorrhages. These can be called the conjunctival reactions, and are harmless.

A fourth form has been observed which is not so harmless, and should be classed by the French name of ophthalmo-reaction. In this form the congestion is great with ciliary injection, phlyctenulae, nodes in the conjunctiva and caruncle, keratitis, with occasional iritis, corneal infiltration and ulcers, episcleritis and iridocyclitis. Total loss of the cilia has been observed.

These appearances are rendered more acute when the tuberculin is used in an eye which has previously been affected in any way. In special danger are eyes affected with: 1. Simple conjunctivitis; 2. Irritated conjunctiva due to previous tuberculin reactions; 3. Trachoma or follicular catarrh; 4. Tuberculosis of the eye.

The author cites a case in which there resulted a severe blennorrhoea, the pus showing no tubercle bacilli, and but few Xerosis bacilli The inner corneal margin showed three large and circumscribed phlyctenules, the spaces between these being filled with minute phlyctenules.

In the reddened nasal side of the eye there were numerous minute, and very minute, yellow, opaque at times prominent, tubercles or nodes. The eye improved under ice compresses and atropin.

Some weeks later she returned with numerous phlyctenules entirely covering the corneal edge, with saturated vessel formation. The entire conjunctiva sclerae was covered with miliary yellowish nodes. In the cornea beneath the epithelium there were numerous white punctiform infiltrated areas. These latter resulted in somewhat larger macules.

In the treatment the author believes that it is of extreme importance to shield the other eye from infection by the pus of the affected eye. This he accomplishes in cases of lessened secretion by bandaging the affected eye, and in cases of much secretion he bandages the unaffected eye. For cleansing the eye he has found the use of glycerin in 1 per cent to 2 per cent solution of greatest value. F. K.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

Clarence Loeb, M. D.,

ST. LOUIS.

M. W. Frederick, M. D.,

SAN FRANCISCO.

Llewellyn Williamson, M. D.,

ST. LOUIS.

The Coordination of Ocular Movements in the Normal and Pathologic States.

Coutelas, Ch. (These de Paris; abstracted in *La Semaine Medicale,* Sept. 16, 1908, T. xxviii, p. 447), divides the movements of the eyes into movements of direction (to the side, upward or downwards) and movements of convergence. In the lateral, there is a connection between the nuclei of the VI and III cranial nerves. Recent investigations have shown, furthermore, that there is an extra-nuclear center of coordination lying in the region of the corpora quadrigemina, near the anterior part of the nucleus of the motor oculi. In addition, the author claims there are two cortical centers. One is a sensory-motor, and lies peri-rolandic; the other is sensory anl lies post-rolandic. The fibers run separate through the central nucleus and the internal capsule and unite at the peduncles. They decussate just in front of the facial fibers. By analogy we may assign to the up and down movements similar cortical centers. Little is known about the associated movements of convergence. They probably also have mesocephalic centers, possibly the median nucleus of the III nerve.

C. L.

Statistics of the Proportion of Contagious Diseases Seen in Ophthalmologic Consultations.

Auge, R. (These de Paris, 1906; abstracted in *Gaz. des hopitaux,* Sept. 3, 1908, T. lxxxi, p. 1195), found in the Lariboisiére hospital in a total of 14,528 patients seen in three years, 2084 with infectious eye disease, exclusive of syphilis and impetigo, or 14.35%. The conjunctival affections form 12% of these. The proportion due to syphilis alone varies between 4.25% and 7.48%. C. L.

The Mercurial Treatment of Old Ocular Paralyses.

Bayard (*La Clinique Ophthalmologique,* Aug. 10, 1908, Vol. xiv, p. 248) does not believe that all old cases of optic nerve paralysis are hopeless. Especially is this true in those of syphilitic origin where specific treatment may effect a cure after six months, a year or even longer. The paralysis usually appears during the tertiary stage, when the patients have ceased treatment either from neglect, or because they thought they were cured. They are usually stubborn cases, and demand an energetic treatment, which should consist of mercury rather than the iodides. Inunction is one method of administering it, but the dosage is not controllable or regular. Then, grey oil is another form, and the amount of the injection can be increased or diminished at the pleasure of the physician. Electricity may also be employed. Iodide of potassium should also be used. Other causes of ocular paralyses are the infectious diseases, such as diphtheria, the intoxications, such as lead, traumata and cerebral tumors. For these conditions eliminatives, strychnia, electricity and operation, when necessary, are indicated. C. L.

The Previous Condition in Relation to Accidents Due to Occupation, Especially Ocular Accidents.

Bettremieux (*La Clinique Ophthalmologique,* Aug. 10, 1908, Vol. xiv, p. 246) believes that the French law which in awarding damages for injury does not take into account the previous state of the part injured should not be applied in all cases. For instance, if a person suffering from a dacryocystitis should receive an injury to the cornea which became infected, the cause of the injury should be held responsible for the loss of the eye. On the other hand, if a man loses by accident an eye which was already blind from some other, pre-existing cause, this fact should be taken into consideration in awarding damages. The author also points out the great necessity for strict supervision of the eyes of railroad employes. C. L.

Two Severe Cases of Ophthalmia Blenorrhoeca Cured by Lenicet.

TERLINCK, H. (*La Clinique de Bruxelles*, 1908, No. 42) reports two cases of blenorrhea treated by lenicet salve. In one case, there was a rapid decrease in the suppuration and a cure of a large corneal ulcer which threatened to perforate. The second case showed the impossibility of ambulant treatment. The salve must be used every two hours, day and night, and in addition 1% silver nitrate applications and lavage with boric acid solution are helpful. However, the beneficial effect of the lenicet alone can not be denied. C. L.

SOCIETY PROCEEDINGS.

SECTION ON OPHTHALMOLOGY.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Meeting October 15, 1908. Dr. Howard F. Hansell, Chairman, presiding.

Several Unusual Forms of Superficial Inflammation of the Cornea.

Dr. Wm. Campbell Posey reported two cases. In the first, a boy, aged nine years, the inflammation took the form of a *dendriform opacity,* which was raised above the surface and possessed a rather grayish white appearance, which was found to be due to a thickened epithelium. The opacity formed with but a moderate amount of conjunctival irritation. The child was in poor health and had suffered from colds in the head and sore throat. The opacity was viewed as allied to the superficial punctate keratitis of Fuchs, the association of the ocular condition with the catarrh of the upper air passages, its mild course, the corneal avascularity, the unbroken epithelial surface, and the slow recovery with the complete restoration of vision without resulting corneal haze being common to both processes. It was also regarded as being perhaps not without interest or significance that when the patient was but eight months old he was treated by the writer for what appeared to be a sharp attack of vernal conjunctivitis in both eyes, the inflammation having appeared in the latter weeks of May and having persisted, despite all treatment, with more or less severity until autumn.

In Case II the corneal opacity took the form of a Y, the base of the Y corresponding to the limbus below, while the arms bifurcated over the center of the cornea and extended to within 3 or 4 mm. of the nasal and temporal limbus respectively. The opacity was sharply defined from the rest of the cornea, which was quite clear, by a regular line of demarcation.

Under high magnification the haze was found to be made up of a homogeneous tissue, which appeared to be studded with numerous small dots and traversed by fine lines. A long blood vessel ran from the conjunctiva below up the stem of the opacity and bifurcated at the summit, to spread out into numerous fine branches at the extremities of the arms of the Y. This vascularity was considered as accidental rather than essential, being viewed as a recent production of conjunctival irritation and analogous to the superficial vascularity which may so often be observed in the later stages of interstitial keratitis. The patient was well nourished, and a careful physical examination revealed nothing more than a few strumous cervical glands.

The corneal condition in this case was viewed as an example of epithelial hyperplasia of cause unknown, but probably also allied to the superficial punctate keratitis of Fuchs. Dr. Posey referred to the recent papers on lesions of the corneal epithelium by Spicer of London, and Charles of St. Louis, and referred to the observations of these authors upon the probable action of a toxin upon the nerve endings in eyes so affected. He referred to previous communications by himself in several papers on keratitis disciformis and one on an unusual form of triangular opacity in the superficial layers of the cornea occurring in syphilitic subjects, and recalled that in these papers he gave expression to the belief that the lesions observed in this class of cases, as well as in keratitis disciformis and ribbon-shaped keratitis, could be explained by a change wrought upon the epithlial and subepithelial cells by the fluids of the inflamed uvea in general, but particularly of the substantia propria of the cornea itself.

Dr. Zentmayer said that there was considerable difficulty in classifying corneal lesions when the condition had not been observed from the beginning. He would hesitate to put the second case in the class designated as superficial punctate keratitis. Clinically the case appeared to be one of fascicular keratitis.

Dr. de Schweinitz thought that it would be difficult to state with accuracy what the original lesion had been in the case under consideration, but he thought with Dr. Zentmayer that it was best explained as the result of some form of fascicular keratitis, particularly as scars in the upper part of the cornea seemed to indicate the position of former phlyctenules. He had himself on two occasions seen a somewhat similar lesion, although not so widely or so elaborately produced, in which, in one instance at least, he had observed it in the stage of a typical fascicular keratitis.

Dr. Posey said that he was not inclined to dispute the views of Drs. Zentmayer and de Schweinitz in regard to the nature of his second case. The changes might, it is true, be of fascicular origin. He had been led to describe the condition as in a way allied to superficial punctate keratitis, not only on account of the appearance of the haze, but also on account of the age of the patient and the absence of acute inflammatory symptoms at any time. In all events, it seems likely that the condition is of epithelial origin, and it is likely that the haze will in course of time clear to a great extent.

Some Unusual Forms of Exudative Chorioiditis.

Dr. de Schweinitz related the case history of a patient, an unmarried woman, aged nineteen years, whose left eye exhibited the following conditions: Decided punctate hyalitis, unevenly swollen retinal veins, and covering a large portion of the eyeground a broad area of greenish white exudate, somewhat knobbed in appearance, over which were scattered numerous glistening masses, probably of cholesterin. This mass of exudate began about 2 disks' diameter from the optic papilla and followed the sweep of the retinal vessels, particularly as they passed downward and outward, as well as upward. There was some fringing of pigment at the margins, and particularly on the disk side of the exudate in the macular region, scattered small areas of pigment. Beyond the main mass of exudate and separated by a narrow band of healthy retina, far out in the temporal periphery, there was a second mass of greenish white exudate. The general elevation of this exudate was about 2 D, but in some places, particularly in thick masses in the lower and outer periphery, the elevation was as much as 6 D. Although the ophthalmoscopic appearances were those of tuberculosis of the chorioid, tuberculin tests were negative, and the most searching general examination failed to find any reason for this somewhat elaborate chorioido-retinitis, nor did it respond to any treatment.

Dr. de Schweinitz contrasted his case and the water color which had been made of the ocular lesions with those recently published by Krause and Brückner, in which tuberculin tests had proved the true character of the lesion. He also compared it with Schieck's case of plastic exudative chorioditis, and thought it more nearly resembled the lesions of this case than any other with which he was acquainted. In this case also no etiological factors were discovered.

Dr. de Schweinitz also discussed plastic chorioiditis in the neighborhood of the optic disk, not only in its well-known appearances as they have been described originally by Nettleship and later by Hill Griffith, Gradle, and other writers, but also as it has been recently reported by Edmund Jansen, who suggests the name retinochorioiditis juxta papillaris. He described two cases of the affection, one of which was more elaborately produced than those usually recorded, and expressed the opinion that in a certain number of cases of unilateral optic neuritis the lesion was a plastic chorioiditis of this kind. He thought that Gradle's suggestion was probably correct that in these cases the infecting material might come from the sinuses or from some focus of infection, or, as he himself had indicated, from the products of intestinal decomposition, and gain access to this region through the posterior ciliary vessels. In most of the cases syphilis and tuberculosis could be eliminated from the etiological factors.

Dr. Randall said that he felt that another phase of this same condition was occasionally seen, as depicted in Table LVII of v. Jaeger's *Atlas,* where the retina was raised in a flask-shaped detachment over the juxtapapillary patch of chorioiditis. There is no appearance of papillitis in v. Jaeger's picture, but it was present in the earlier stage of one or two cases which he had observed before the retinal detachment occurred. This ruptured, and after the absorption of the exudate which escaped into the vitreous, the retina was seen to have returned to its place and the chorioid went on to the atrophic condition common to the cases as described by Dr. de Schweinitz.

Plastic Operation for Cicatricial Ectropion.

Dr. William Zentmayer exhibited photographs of a *"Case of Extensive Plastic Operation for the Correction of Cicatricial Ectropion of Both Lids."* The deformity had resulted from a burn. A dense cicatrix over the outer fourth of the supraorbital margin had drawn the upper lid away from the globe without everting it. A scar of varying density surrounded the entire supraorbital margin, extending for a distance of 2 cm. onto the forehead. A very thick cicatrix involved almost the entire malar region and extended over the side of the nose beyond the bridge and between the base of the nose and the upper lip, drawing the upper lip up almost to the alae of the nose. The lower lid was completely ectropionized, the conjunctival surface being on the plane of the cheek and its free border on a line with the tragus. Because contraction was still taking place all of the scar tissue had to be removed. To correct the ectropion of the upper lid a pedicle flap was turned in from the forehead, and the raw surface thus left was grafted. For the lower lid the Hotz method was pursued, with partial success. Subsequently a pedicle flap extending downward from the outer canthus was swung in below the lower lid, and the bared area remaining was covered in by a flap from the sternocleido region, where the skin was loose and the edges of the wound readily brought together.

Finally, the eversion of the upper lip was corrected by using a flap turned in from under the chin. The result so far as correcting the deformities was almost perfect.

Amaurotic Family Idiocy.

Dr. Mary Buchanan (by invitation) showed a case of *Amaurotic Family Idiocy.* The child, a male, aged sixteen months, first born of Jewish parents, showed signs of this disease at about eleven months. Previously he had been an unusually large, healthy baby, with average intelligence, and was breast fed. Antenatal and family history were negative. The child now looks fat, but is unable to hold its head up, stand or sit alone, and pays no attention to its surroundings except to start at the slightest sound.

The eyes are freely movable, but do not attempt fixation and frequently have a pronounced stare. The pupils are dilated and react sluggishly to light. The media are clear; the disks are white and atrophic and sharply defined; the arteries are much reduced in size. At each macula is the cherry-red spot surrounded by the white, horizontally oval areola about one and one-half disk diameters, characteristic of this disease.

Edward A. Shumway,
Clerk.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of October 10, 1908, in Denver. Dr. Edward Jackson presiding.

Foreign Body in the Eye.

Dr. Melville Black presented a man, aged 52, who five months before had received a glancing shot on the left supraorbital ridge from a 30-30 rifle, fired at a distance of 20 feet. The bullet was a steel jacketed projectile and the powder was smokeless. He fell to the ground, stunned for a few moments. After the blood was washed from his face he noticed that the vision of his left eye was slightly damaged. He gave it no attention, however, and the treatment was all directed to the supraorbital skin wound. He had no pain in the eye, but the vision was gradually reduced to light perception. There remained no evidence of fracture of the supraorbital margin of the orbit, and the skin wound left little or no scar. In the superior temporal quadrant of the cornea a small scar was noticeable, and just underneath it there was a small hole in the iris, and the lens was totally opaque. The cornea showed a slightly milky appearance and the tension was about plus 1. A radiograph, taken the day before the patient was presented, indicated the presence of a foreign body in the eye and three smaller foreign bodies back of the eye in the orbit.

Dr. Black thought it was an interesting speculation as to how these foreign bodies got into their present position, the most likely presumption being that a piece of steel jacketing which covered the projectile was torn loose during its passage through the rifle and, dropping a little lower than the bullet, struck the eye. Or he had been told by Col. LeGard, that it was possible for particles of lead to fly from a bullet; and it might be that in this case particles of lead or steel jacketing penetrated the eye and orbit. He also had learned that it was possible for some forms of smokeless powder to penetrate blotting paper, fired at a distance of 12 feet.

Dr. Black had advised enucleation.

Discussion.—Dr. Stevens mentioned the removal of a piece of smokeless powder 3½ mm. long by 2 mm. square, from an eye in which pain followed the explosion of a 30-30 cartridge.

Dr. Conant recalled the case of a miner with a particle of coal lodged in and penetrating the cornea. The part penetrating into the anterior chamber, broke off and fell to the bottom of the chamber, during efforts of removal. During observation of the eye for two months following, no trouble arose.

Double Ophthalmoplegia.

Dr. D. A. Strickler showed a man, aged 50, with paralysis of all the external muscles of both eyes, of 17 years' standing and of unknown causation. The onset had been sudden, the paralysis complete in a few months, and no change had occurred until the past two months. Then, following a night of severe-headache, chemosis appeared in each eye; the right being very edematous, the left slightly so. V. = 20/40 in each eye, with glasses. Retinitis existed, with marked albuminuria, granular casts, and blood pressure of 195 mm.

The patient was a heavy eater and suffered from intestinal toxemia.

Discussion.—Dr. Stevens recalled a case in which there was only slight upward and downward motion in the right eye, and slight inward and outward movement in the left. The pupils reacted to light. Chemosis was marked.

Dr. Jackson spoke of a case of 20 years' standing, following sunstroke, in which a 5 degree prism, base out, was required for distance, and a 5 degree prism base in, for near. He also mentioned a case which he had lately observed in which there was no convergence.

Tubercular Uveitis.

A case of relapsing uveitis, with old iritic adhesions, in a woman of 23, was presented by Dr. Strickler, under whose care she had just come.

R. V. = 20/40 partly cum —0.50 ⁐ —2.00 cyl. ax. 45 degrees.

L. V. = light perception only, on account of cataract. Two years previously she had consulted Dr. Jackson, stating that she had been under the care of oculists for six years on account of these adhesions, and that sight had varied greatly, suddenly diminishing, even to bare light perception, followed by slow improvement. The eye-balls were never red or painful, although lacrimation accompanied close work. Vision in 1906: R. 4/20 plus, cum — 2.50 cyl. ax. 15 degrees = 4/9 plus. L. 2/60, cum — 3.00 cyl. ax. 170° = 4/9 plus. The pupillary margins were largely held by organized exudate, the vitreous was very cloudy, and the fundus details were not seen. In the succeeding six months Dr. Jackson gave potassium iodide and applied dionin, during which time a large area of the right pupil became clear.

Discussion.—Dr Jackson now considered this case one of tubercular uveitis; recalling a similar case in which the use of Calmette's reaction in the blind eye had given a positive result, and the administration of tuberculin had proved beneficial. In the case presented he would employ some test for tuberculosis.

Dr. Coover recalled a child of four years in which both pupils were bound by adhesions, the right lens being clear, the left cataractous. The general health improved greatly under treatment by codliver oil. He would do iridectomy in left (cataractous) eye of the case under consideration.

Dr. Walker advocated iridectomy and tubercular treatment.

Dr. Ringle mentioned three cases of annular posterior synechia, with no history of pain, and thought by him to be of rheumatic origin.

Dr. Black thought the pendulum was swinging to the side of tubercular ocular affections. He considered this case to be tubercular, but would not attribute too many ocular affections to tuberculosis.

Corneal Deposit Following Old Trauma and Recent Tuberculosis.

Dr. D. H. Coover showed a man of thirty-six, who had lately consulted him, stating that only in the previous 48 hours had he noticed a white deposit in the right cornea. The outer part of this deposit was a filmy infiltration, and the deeper portion resembled fish spawn in appearance, was triangular in shape, and dense at its base. The fundus reflex was visible. Dionin and pilocarpin were first used. The Calmette's ophthalmo-reaction was used three times, in ½ or 1% strength, the typical reaction occurring only after its third application.

The temperature was found to be 99.4° daily for many days, and the family history tubercular. Once a week for four weeks tuberculin was administered; followed by gain in weight and slow but gradual absorption of the deposit.

Dr. Jackson had seen this patient five years before, when he noted an aphakic eye which had followed a severe blow and resulting ocular inflammation, occurring eight years before. There had been a recurrence of inflammation lasting a week, one year before consulting Dr. Jackson; and the patient stated that the sight was then even worse than the dimness of vision that had existed in the right eye as long as he could remember.

The central portion of the cornea was quite hazy, the anterior chamber deep, the iris flat and slightly degenerated, with thin gray shreds of membrane hanging from the temporal margin of a 3 mm. pupil, which was slightly irregular and did not enlarge under a mydriatic. There was a faint fundus reflex. Dionin 1:180 was prescribed, to be used once in three days.

In 1905 Dr. Libby had seen this case, noting that the eye was passively congested and the cornea quite hazy, except near the upper margin and a small, round clear area corresponding to the center of the pupil. Dionin 1:120 was ordered, once every two or three days, and yellow oxide ointment 1:120 on the other days, for one month. The patient did not present himself for further treatment, but reported that the eye became more comfortable than it had been for the previous year.

Discussion.—Dr. Bane confirmed the gradual clearing of the deposit during his observation of this eye in the last four weeks.

Dr. Black advised the removal of the eye.

Penetrating Sclero-Corneal Wound.

Dr. G. H. Strader reported a child of 12 years with a wound at the sclero-corneal margin and a blood streak running from this point back through the vitreous. A blank cartridge had exploded near the eye. V. = 20/20. No reaction followed after a few days.

Spectacles for Children.

Dr. C. A. Ringle had lately prescribed 6.00 D. spherical for convergent squint in a child of 2½ years. Dr. Black used a 3 mm. wide, light bridge, for children.

Dr. Stevens employed a tape tied around the head from below the occiput to the crown, and through rings at the end of the temples of the spectacle frame, to hold the glasses on in case of absence of nasal bridge.

Paresis of External Rectus.

Dr. D. H. Coover related a case of paresis of the external rectus in a child of 3 years, following a week's illness with enteritis. After the bromide and iodide treatment for three weeks the muscle had about recovered its normal action. Dr. Coover also spoke of great upward and outward squint since birth in a woman of twenty-seven. V. = 10/200. On operating, he could find no superior or inferior rectus; but pulled the eye down by a tuck in Tenon's capsule, below. He proposed, further, to tenotomize the internal, and advance the external rectus.

Scleritis Following Typhoid.

Dr. E. R. Neeper reported scleritis and posterior synechiae following typhoid fever. There was apparently a drop of pus in the lower part of the lens, which became opaque. Under subconjunctival injections of 15 minims of 1% solution of potassium iodide vision rose from fingers at 18 inches to 20/200, but was subsequently lost.

Optic Neuritis and Central Scotoma.

Dr. E. W. Stevens reported a woman in middle life suffering from slight stupor, slow pulse, subnormal temperature, headaches, failing vision, and moderate optic neuritis with central scotoma. V. = 4/20, each eye. History of nasal discharge stopping at onset of above symptoms.

Recovery followed opening of the posterior ethmoidal and sphenoidal cells. Dr. Stevens also mentioned a case of orbital cellulitis, diplopia and exophthalmos, which he thought arose from the sphenoidal sinus, posteriorly.

George F. Libby, Secretary.

OPHTHALMIC SECTION.

ST. LOUIS MEDICAL SOCIETY.

Meeting of April 8, 1908. Dr. A. E. Ewing, presiding.

Sarcoma of the Orbit.

Dr. John Green, Jr., presented for Dr. Luedde, a patient perviously shown to the Section in October or November, with sarcoma of the orbit. Since the first presentation, Dr. Mudd had done a complete exenteration of the orbit, had made a large flap, and sutured the lower portion of this flap to the cheek so that the gap was entirely filled in and there was but little cosmetic defect.

Discussion.—Dr. Carl Barck doubted whether it was a wise procedure in such cases to entirely close the orbit. If there should be a recurrence, it would be at that site and, in conditions as dangerous as sarcoma, the first object and aim was the preservation of life. When the entire orbit was lined by skin grafts, in two weeks' time it would be fairly healed and the orbit was then open to inspection, and in cases of that character the orbit always should be open to such inspection.

Two Cases of Removal of Pieces of Steel From the Vitreous.

Dr. Carl Barck presented two cases, having the common feature, that the foreign body entered through the corneoscleral margin and the root of the iris, without injuring the lens, and that it was extracted in both cases through a scleral section.

The first case was injured on the fourth of March. The company physician, who saw him first, stated that there was nothing in the eye. Some days later he went to a clinic. There was a small sear one mm. long in the lower temporal quadrant of the corneo-scleral margin, laterally to the end of the vertical meridian. Iris dilated (atropin in clinic) with the exception of a strong adhesion in upper nasal portion. Lens transparent; but a roundish opacity just upon center of anterior lens capsule. I took this to be an iritic deposit, as he had not used any mydriatic during the first days. The vitreous was cloudy; infiltration with blood. Fundus just about visible, without details. V—3/60.

Patient was placed before the giant magnet; it caused a sensation of pain. Nothing else. Was sent to Dr. Wells for x-ray picture. Dr. Wells did not get a good picture this day and ordered him for the following day. The picture was not received in time. The next morning when everything was ready for the operation, the vitreous was somewhat clearer, the blood having settled down. Some shine could be seen with the ophthalmoscope, and a foreign body located in the outer, lower quadrant, close to the bottom and about in the equatorial region. In narcosis a scleral section was made and the chip was touched by the hand magnet at the first introduction, and followed the withdrawn magnet. It is about two inches long, with a sharp end. Weight less than 10 mgrs.

This case is presented for two reasons. The healing process was regular, only that the mentioned opacity in the center of the lens increased during the first two weeks and had a peculiar appearance. It looked as if there were a number of minute holes in the anterior capsule. Since some days this spot has decreased again in size.

The x-ray picture received three hours after the removal, located the foreign body exactly, and Dr. Wells made also a drawing of the size and form of the foreign body, which proved to be absolutely correct.

The second case was injured on the first of April and seen next morning. A needle of a machine had broken into pieces and one struck the eye. Scar in corneo-scleral margin, outer lower quadrant, slightly below horizontal meridian, irregular, about 2 mm. long. Lens transparent. Nasal two-thirds of vitreous clear. Optic disk and nasal half of retina plainly visible. In lower temporal half of vitreous there is a large hemorrhage, in which a shining whitish body can be plainly seen with the ophthalmoscope. Localization: Not far from posterior wall and about in center vertically. The giant magnet was not tried, for fear of injuring the intact lens. Operation at noon in narcosis. Scleral section between inferior and external rectus as in the previous case. After introducing the hand magnet the click was felt, but the foreign body did not follow. It was probably caught at once, but arrested by the scleral wall, lying crosswise behind it. A second introduction of the magnet was not easy, because the conjunctival section was smaller than the scleral one. The second attempt brought the chip into the wound with some chorioid in which it was caught, and it was then seized with forceps and fully extracted with forceps and magnet combined. The healing process was normal. The vitreous is now somewhat more infiltrated with blood, but the fundus in part still visible. Vision today — 6/36. The piece is about 4 mm. long, quite thick and weighs about 50 mgrs.

Specimen of Intraocular Sarcoma.

Dr. Carl Barck demonstrated this specimen because it presents a rare type of chorioidal sarcoma.

The history is briefly as follows: The patient is a gentleman, 52 years of age. About a year ago he noticel accidentally that he could not see with his left eye. Was treated somewhere else for detachment of the retina. He was first seen on the sixth of February. Outer portion of vitreous fairly transparent. In upper nasal quadrant the tumor, which reached close to the lens from behind, could be plainly seen by oblique illumination as well as with the ophthalmoscope. Its sharp circumscribed outlines, considerable projection into the space of the vitreous, and want of motion of the overlying retina, made the diagonsis a simple one. The transillumination showed a striking difference when tested from the nasal and the temporal side respectively.

Enucleation next morning. In the upper part, which was used for microscopical sections, the tumor was not in connection with the chorioid; this latter lined the sclera and was normal. Also on the portion given around, it seems that the tumor is not adherent to the chorioid, whilst it is in connection with the detached retina. As a matter of course, there must be a pedicle somewhat farther down, as we know only chorioidal tumors at the age of the patient. Such roundish, sharply circumscribed chorioidal sarcomata are rare; it is the first specimen of this type I have come across. Mostly the sarcomata of the chorioid have a broad base and a lobate, cauliflower-like surface. In Kerschbaumer's monograph I could not find a similar picture. Dr. Alt told me that he has seen a few similar specimens.

The section shows that we have to deal with a small round-cell sarcoma. According to the usual terminology it would be called a leukosarcoma. But also in these a number of pigment cells are invariably found, and you find the same in this specimen, especially in and around the blood-vessels, which are quite numerous.

Discussion.—Dr. Henry Muetze thought the result as good as he had ever seen. He had reported a case several months ago in which he had removed a piece of steel from the vitreous, but the result had not been nearly so gool, especially so far as vision was concerned. The x-ray located the piece of steel very readily and the next day he had removed it under cocaine anesthesia. Three attempts had to be made before it could be removed. In the first two attempts the piece was brought up at right angles to the scleral wound and slipped back. He had read recently of a little instrument made of aluminum to separate the scleral wound in a case of this kind and it seemed that such an instrument would be of advantage. When the patient was discharged, at about the end of a month the pupils were widely dilated. The patient was put on mixed treatment and two months later presented himself with an iridocyclitis. There was pain, sensitiveness to light, and the scar was drawn inward a little. When discharged he was able to count fingers at ten inches, two months later he could note only the movement of the hand at a distance of twelve inches. He was unwilling to have the eye removed and was sent home with instructions to return if he had further trouble. That was in November, and the speaker had not seen him since.

Dr. Ernst Saxl said that the results, when at all successful, were usually very good. He had seen, about three years ago, the best result in such a case that had ever come to his notice. The patient was brought to the office about three hours after the injury. The foreign body could not be located by the ophthalmoscope or in any other way, until it was located by means of the giant magnet. At the second or third attempt the foreign body came out through the opening it had entered. There was scarcely any pain following its removal and three months later the vision was 6/6 and a complete field.

A Study of the Ocular Manifestations in a Case of Hysteria.

Dr. John Green, Jr. (Patient exhibited in conjunction with Dr. S. I. Schwab).

Through the kindness of Dr. Schwab, an extended study of the hysterical ocular manifestations was made in this patient.

M. R., aged 32, native of Roumania, came under observation Feb. 24, 1907. For several months he had suffered severe pain through the temples and bridge of nose. This pain had recently grown more severe. About three weeks ago he first noticed diplopia. At first only occasional, but now fairly constant.

The patient's face, except for a slight frown, was peculiarly expressionless. This mask-like aspect was accentuated by a drooping of the lids, slightly more pronounced on the left side. The lids can be raised but not to their full extent, and the effort at elevation can only be sustained for a few seconds. In consequence, the patient is obliged to throw his head well back in order to see, very much after the fashion of an individual with bilateral ptosis. The facial aspect is very characteristic and has been observed unchanged in all his attacks.

On directing the gaze straight forward, the left eye appears straight, but quickly changes to 10° convergence, with complaint of diplopia. The mobility of each globe is unrestricted in all parts of the field of fixation. On looking up slight vertical nystagmus is developed.

A study of the double images seemed to indicate a paresis of the left abducens. Ophthalmoscope showed normal eyegrounds. Form fields were concentrically contracted in moderate degree.

O. D. H. .75 V. 16/12. O. S. H. .75 V. 16/12.

At this time I was inclined to regard the case as a beginning retrobulbar neuritis associated with paresis of the left abducens. The patient entered the Jewish Hospital in Dr. Schwab's service and I did not see him again until March 30, 1907, five weeks later.

O. D. V. 3/75 c — 4. sph. 18/75.
O. S. V. 3/96 c — 4. sph. 18/120.

Eyegrounds normal. Fundus detail clearly seen with — 3. sph. behind mirror (accommodative spasm).

Form fields very much contracted—with partial central scotomata, R. and L. O. S. Convergent 10°.

Next observation five months later, August 18th. The improvement in the patient's appearance was so remarkable that I did not recognize in him the woe-begone individual of my first two observations. He was indeed the very picture of health. Every trace of his former ocular troubles had vanished.

R. V. 16/12. L. V. 16/12.

Eyegrounds normal; details visible with plus 1 sph. No diplopia. Fields full.

The developments in the case led me to reject my first view of a retrobulbar neuritis and to incline to the diagnosis of hysteria.

I did not see the patient again until Jan. 30, 1908. Through the kindness of Dr. Schwab I have been able to make a more extended study of the case, eliciting various phenomena which can hardly be explained on any but an hypothesis of hysteria. The facial appearance is precisely as on Feb. 24, 1907.

Both orbicularis muscles exhibit frequent slow contraction, especially well marked in the fibers of the lower lids. Narrowing of palpebral fissures. The patient can with an effort raise both upper lids, though not to the full extent. If, during this act, the patient be directed to gaze vacantly into space, both globes converge, the right 10°, the left 15° and diplopia occurs. Pupils equal, light and convergence reactions normal.

R. V. 18/75. L. V. 18/75. Not improved by spherical lenses.

The red glass test developed a homonymous diplopia in all portions of the field, the images remaining at the same level. The separation of the images is least, however, in the right field and increases progressively as the gaze is carried to the left. With the candle flame at 3 m. the separation of the images to the right is 60 cm., to the left 150 cm.

Form fields again show concentric limitation.

Color fields show a partial inversion, more noticeable R. than L. The field was also plotted on a campimeter at 30 cm., 60 cm., and 90 cm., disclosing the existence of a typical tubular field.

A searching examination of the fundus under euphthalmin failed to disclose any abnormality.

With the left eye screened, an ivory rule held vertically or horizontally at a distance of 3 m. is declared to be doubled (monocular diplopia). The images separated 3 cm. As the rule is brought nearer, the images approach one another and fuse one meter from the eye. With the right eye screened, a similar phenomenon is observed. Carrying this test to a step farther, I screened the left eye and found that by interposing a vertical prism in such a manner that the base bisected the pupil, a quadrupling of images at once resulted. With a prism base in (similarly placed with respect to the pupil) there occurred a quadrupling of the horizontally held rod.

Feb. 3. V. 18/38 either eye.

A few moments later V. 18/12 O. D. 18/15 O. S.

O. D. p. p. 16 cm. O. S. p. p. 16 cm.

The double images are precisely as at former examination. No monocular diplopia.

This examination appears to have coincided with the subsidence of the attack. The patient declares that from this time up to Feb. 25th he was not conscious of any ocular trouble. On the latter date he resumed his employment. (That of painter.) While standing on the rung of a ladder two feet up, he suddenly felt as he had received two hammer strokes on the top of his head and fell to the ground. He was probably momentarily unconscious. Immediately he became aware of fogged vision and diplopia.

Examination, Feb. 26th.

There is a constant fine tremor of the fibers of the orbicularis. Both globes are in a position of slight convergence, which becomes more noticeable when the eyes are widely opened.

On attempting to look to the right, the left globe without hesitation passes through a full arc. The right, on the contrary, comes to a stop 15° beyond the median line. If the patient is then urged to exert every effort, the right globe resumes its interrupted dextroversion and by a series of nystagmic twitches, attains a nearly full excursion.

A precisely similar phenomenon is observed in the left eye in the effort at levoversion.

Pupils equal. React sharply to direct, sluggishly, to consensual stimulation. Without change in illumination, or convergence effort, both pupils are observed suddenly to dilate, and as suddenly to contract, remaining for several seconds motionless in moderate miosis (2 mm.), which is again succeeded by mydriasis.

R. V. 3/75; with — 5 sph. 18/75.

L. V. 3/48; with — 5. sph. 18/60.

Double images as before.

Feb. 27th.

Screening the left eye, an object is placed on the table to the patient's left. On attempting to pick it up, his hand invariably hovers in the air to the right of the object, i. e., he undershoots the mark. With the right eye screened, an object placed to the patient's right, is felt for to the left of the object.

Vision has now been reduced to 3/192 O. U. not improved.

March 17th. Both pupils have now become very sluggish to light. While directing a pencil of light into the eye, it was observed that the pupil dilated widely (paradoxical pupillary reaction).

Diagnostic comment.—First as to vision: This ranged from 16/12 (O. U.) Hyperopia .75 D. to 3/192 O. U. That the diminution was due in part to accommodative spasm is evident from the examination of Feb. 26th, when the interposition of a 5 sph. raised vision from R 3/75 to 18/75, L 3/48 to 18/60. At this time the fundus details did not become clear until a — 5 was placed behind the mirror. On Feb. 27th, when the vision had fallen to 3/192 O. U. — spheres up to 20 D. did not improve. We cannot escape, therefore, the idea of a true hysterical amblyopia. Was the partial ptosis due to paresis of the levators, or spasm of the orbicularis muscles? The latter seems the more likely on the following grounds: (1) the presence of fine fibrillary twitchings in the orbicularis fibers; (2) the patient can by a strong effort of the will elevate the lids to some extent, without invoking the aid of the occipitofrontalis. (3) There is no elevation of the eyebrows on separation of the lids.

The question arises, are we dealing with a convergence spasm and spastic strabismus, or with a paresis of the abducens, or with a paresis of the abducens on one side and a spasm of the internus on the other? The behavior of the double images in convergence spasm is characteristic. They have the same separation on looking to the right as when the patient looks to the left. But in the present case, homonymous diplopia, present in all parts of the lateral field, is least to the right and increases progressively as the object is carried to the left. On the other hand, there is hardly any limitation to outward movement, of either eye, when the patient is urged to do his best. Confirmation is furnished by the greater rapidity and range of the primary version to the right of the left eye, and vice versa. Let it be remembered, also, that with one eye screened, the patient undershoots an object situated within the field of action of the affected muscle. The reason for this, as stated by Duane, is, "that the patient underestimates the distance that the eye travels, since he is aware only of the effort that he is putting forth in order to look at the object, and with an overacting muscle this effort is less than normal."

All things considered, I am inclined to the belief that the condition is one of true convergence spasm, possibly associated with paresis of the left abducens.

Monocular diplopia was observed only during accommodation spasm. The basis of this phenomenon, according to Parinaud, is a spasm of the ciliary muscle. If the spasm is complete, the eye is adapted for a fixed point. On either side of this fixed point diplopia appears, as the result of structural defects in the crystalline lens. De Schweinitz quotes Parinaud as follows: "The disposition of the anterior portion of the lens in three segments, favors its changes in curvature, but at the same time, owing to their separation from one another by layers of amorphous material, each section possesses a focal point of its own, capable of producing images distinct from that yielded by the lens as a whole. The condition of spasm, by increasing the convexity of the anterior surface of the lens, serves to emphasize the diplopia arising from the structural defects described. Pirere Janet believes that occasionally this phenomenon is to be ascribed to psychic origin.

In the present case the doubling of the double images (quadrupling of images) lends support to the theory of Parinaud.

Other phenomena described in the report—contracted fields (on one occasion with partial central scotoma), partial inversion of the color fields, the presence of tubular fields and the paradoxical pupillary reaction—are mentioned as points of evidence in support of the conception of the essentially hysterical nature of the ocular phenomena.

Meeting of May 14, 1908. Dr. A. E. Ewing presiding.

Removal of a Steel Fragment from the Vitreous.

Presentation of patient and specimen by Dr. J. P. Shoemaker.

Dr. Shoemaker showed a piece of steel, which by means of the large magnet had been withdrawn from the vitreous through the lens and removed through the original wound. When using the magnet the fragment had dropped into the lower part of the anterior chamber, and Dr. Shoemaker had to consider whether it would be better surgery to make a corneal section and withdraw it that way or attempt to withdraw it through the original wound. He chose the latter course .

Discussion.—Dr. John Green, Jr., stated that one aspect of the case presented by Dr. Shoemaker, namely, the likelihood of injury to Descemet's membrane from the metallic fragment striking forcibly against the posterior surface of the cornea, reminded him of a case seen about two years ago. A patient presented himself with a cataractous lens in which a fragment of steel was imbedded. The giant magnet was first used with the idea of loosening, but not dislodging the fragment from its lenticular bed. However, at the first application the fragment sprang out of the lens and dropped into the anterior chamber. An incision through the cornea permitted the introduction of the hand magnet, and the fragment was drawn up toward the wound, but fell back into the space behind the iris. After repeated attempts, the fragment was finally withdrawn. In the course of manipulations it was dashed repeatedly against Descemet's membrane. The wound healed promptly, and he could not convince himself that Descemet's membrane had sustained any noteworthy damage.

Dr. Carl Barck thought that in most of these cases it was safer to make a corneal section. In an effort to extract through the original wound, two factors must be taken into consideration: (1) It was not advisable unless the patient was seen shortly after the injury, because of the adhesions which might have resulted, and (2), it must depend upon the size and form of the foreign body. In the case of a foreign body of irregular formation, it was more dangerous to remove it through the wound than to make a corneal section.

A Further Report on a Case of Quadrant Anopsia.

Presented to the Section at the November meeting by Dr. Llewellyn Williamson.

Dr. Williamson recalled to the memory of the Section the case of quadrant anopsia, presented by him at the November meeting, at which time the visual defect involved the entire lower and outer part of the left field from the 75 to the 180 meridian, and the entire lower inner part of the right field from the 75 to the 180 meridian. The defects as shown by the perimeter at that time were homonymous and strikingly regular, the extent of the scotoma being absolutely the same in both eyes. The cause of this defect had been diagnosed at that time as a hemorrhage in the region of the calcarine fissure on the right side. That the diagnosis was probably correct, and that there had been an absorption of the hemorrhage to a large extent, was shown by visual charts now presented.

There is still a homonymous defect, regular and of equal size in each field, but involving a much smaller area than formerly. Instead of the complete quadrant defect extending from the 75 to 180 meridian and reaching well into the fixation point, the defect at present is only a slight V extending from the 75 to the 105 meridian and extending no nearer than 30 degrees to the fixation point.

The man himself reports that his vision is very much improved and that the peculiar feature which directed him to an oculist, that of seeing half a word or object looked at, has entirely disappeared.

This supplementary report is made the Section, because it is interesting that a hemorrhage of this kind should be so completely absorbed without leaving any permanent traces of injury behind.

Discussion.—Dr. Barck thought cases of this kind exceedingly interesting. There were not so many on record and the members of the Section should be grateful to Dr. Williamson for showing the second field of vision. It would be interesting to see another field in a few months.

A Piece of Steel Removed from the Vitreous by Means of the Hand-Magnet.

(By Dr. Henry Muetze.)

The patient, a railroad laborer, 40 years of age, presented himself April 25, 1908. On April 21, 1908, in holding down a rail while it was being cut, something suddenly struck him in the left eye, causing immediate blindness. Inspection revealed a perforating horizontal cut, extending from the center of the cornea outwards to the limbus, hypopyon and traumatic cataract. Vision was completely abolished.

The missile, a short piece of steel, weighing about a grain, was easily located in the vitreous by the x-ray and extracted under ether anesthesia by the hand-magnet, through a scleral incision between the superior and external recti muscles. As on previous occasions, some difficulty had been experienced in extricating the foreign body from the wound. A cut of an aluminum instrument was shown, by the introduction of which extraction would be greatly facilitated.

Discussion.—Dr. Barck believed that in all instances where a foreign body entered through the sclera and the lens was intact, that the giant magnet was contraindicated. A corneal section would do less harm. He had tried a number of different instruments to keep the scleral wound open, but this could best be done by the use of small surgical forceps. The Graefe knife was a poor instrument for a scleral section. The sclera was yielding and it was difficult to enlarge the wound with this instrument. He used an instrument about twice as wide as the Graefe knife. In the last case operated upon, he had used this knife and found afterward that he had considerably more difficulty than he had ever had with the wide knife. He used the same knife for a posterior sclerotomy. He went directly through with the knife and kept the wound open with the forceps. It might be of advantage to have the forceps made of aluminum.

A Case of Traumatic Cataract with Retention of Foreign Body in Lens for One and Three-fourth Years.

(By Dr. Henry Muetze.)

In October, 1904, the patient, while striking a cotter pin with a hammer, was struck in the eye; sight being suddenly obscured. Was treated for a few weeks and then resumed work. When seen by the writer, December, 1904, a very small scar in the inner part of the superior external quadrant of the cornea and traumatic cataract were found. Vision—fingers at 12 feet. Refused x-ray examination and possible operation. Not seen again until April, 1906, when he presented himself, suffering from a contusion of the right eyeball. Vision—O. S. was then hand-movements at 6 inches with good light-production. Consented to be operated upon and flap extraction with iridectomy was performed June, 1906. On sixth day after operation violent iritis set in, which subsided within about a week under appropriate treatment. A dark substance like a prolapsed iris was then noticed about the center of the operation scar. Eye cocainized and the greater part of brown mass, which felt hard to touch, removed by a sharp instrument. Loss of aqueous prevented complete removal until several days later. The substance was not affected by the magnet and the patient thought it might have been a small piece of coal clinging to the cotter pin at the time he struck it.

Undoubtedly at the time of the injury it became imbedded in the lens and was brushed off by the inner lip of the wound during the extraction of the cataractous lens, causing the inflammatory reaction referred to. The eye healed rapidly and the patient did not report again until a week ago, almost two years after the operation. At present the eyeball has normal tension, a good key-hole pupil and with proper lenses distance vision is 10/35 and near vision Sn. 0.75 at 6 inches.

Unilateral Dacryoadenitis of Metastatic Origin.

Presentation of patient by Dr. Meyer Wiener.

Dr. Wiener presented a patient, aet. 19; family and previous history good. About a year ago had contracted gonorrhea with constant discharge, varying in degree since. Past three weeks had had practically no discharge from urethra. Few days after discharge stopped, a swelling appeared over the upper and outer part of right eye. Lids swollen, edematous and tender, could not open eye.

Examination of patient May 6, showed marked swelling of lids in region of lacrimal glands. Swelling around lids for some distance, hard, edematous. A peculiar swollen and red area over the right temple about the size of a dollar; somewhat tender on pressure. Pre-auricular and sub-maxillary glands enlarged, no enlargement of cervical glands. Conjunctiva swollen and so chemotic as to almost cover cornea; on eversion a large, sharp, bluish mass presented, toward the upper and outer side. Periosteum at the upper orbital margin somewhat infiltrated. Temperature 99°, pulse 82, respiration 24.

Diagnosis of acute dacryoadenitis due to infection from gonorrheal toxines was made and patient put to bed after warm bath and dose of magnesium sulphate. Hot compresses applied over eye after three hours, and after each application a 10% ichthyol ointment was used. Daily improvement until May 14, when swelling had disappeared and patient was discharged.

Discussion.—Dr. M. H. Post had had two of those cases of inflammation of the lacrimal glands. The first of these he had seen many years ago, and at that time he had tried to find something about the condition, but it was rarely mentioned. The patient was one of his friends and suffered considerably. The case was treated with warm applications. There was a formation of pus which had to be removed through the skin. Within the last six months another case had come to him with a similar condition, and dreading a similar result, he had had the patient remain at home and keep quiet. In this case he had used cold applications on the swelling. The pain was not so severe and it discharged through the conjunctival sac, followed by complete recovery. The result under cold applications was far better than the result under hot applications. In neither case was there any history of venereal infection.

Dr. C. Loeb had had a case, the patient being a boy of 12 years. There was extreme swelling of the lid. The next day it was worse and there was hyperemia of the conjunctiva, and just above the external canthus was a hard mass. A ten per cent. ichthyol salve was used, and in four days the child was comparatively comfortable.

Dr. Green had seen a case at the Female Hospital, the patient having been sent in with a diagnosis of gonorrheal bilateral conjunctivitis. There was a distinct swelling in the region of both lacrimal glands. The patient six months before had contracted gonorrhea, which had not been treated. A few months later there developed an arthritis and the patient was laid up for several weeks. Subsequently, the patient had another attack of gonorrhea. The ocular condition was a metastatic gonorrheal dacryoadenitis. The case was treated with hot compresses, and in the course of a week was so far recovered as to be able to leave the hospital.

The whole subject of metastatic dacryoadenitis, he said, had been very thoroughly discussed at the meeting of the American Medical Association in 1907, and the general opinion seemed to be that these cases were self-limiting.

Dr. Wiener said that he had used ichthyol ointment and hot applications. That was all that was used and there was no suppuration.

The Pathological Aspect of Cerebral Decompression in Choked Disk and the Neuro-Retinitis of Bright's Disease.

(By Dr. N. M. Semple.)

Attention is called to Dr. Cushing's address before the St. Louis Medical Society, delivered in December of last year. The part especially referred to was that reporting, very briefly, the case of a young girl, on whom a subtemporal decompression was performed. The condition of the patient was one of profound uremia, with marked cerebral manifestations. There was also intense swelling of both optic disks, together with what was termed a typical "Retinitis Albuminurica." The operation was determined upon largely on account of the latter condition. The results were good temporarily—a cessation of the headache and vomiting, and extraordinary improvement in the neuroretinitis.

Reference is also made to the experimental work of Drs.

Cushing and Bordley, of Johns Hopkins University, carried out with the view of proving the pathological identity of the two conditions, choked disk and the neuroretinitis albuminurica, thereby justifying subtemporal decompression in the latter condition.

(A detailed account of these experiments is to be found in the transactions of the Joint Session on Ophthalmology, and Mental and Nervous Diseases, at the meeting of the American Medical Association, Chicago, 1908.)

In order to study the question raised by the above investigation, a brief reference is made to the present conception among pathologists of the two conditions. For the pathology of choked disk, attention is called to a series of articles by Kamperstein from the clinic of Prof. Uhthoff in Breslau, which appeared in the *klinische Monatsblätter f. Augenheilkunde* during 1904 and 1905. From the microscopical study of fifty-five eyes, the author comes to the conclusion that, in most cases, the pathogenesis of choked disk is to be found in an edema originating in the brain, from there extending along the sheaths of the optic nerve into the papilla, where it causes the acute inflammatory reaction, occurring at this point largely on account of the hard scleral ring and the resistant inelastic lamina cribrosa. This is the conception of the causation of choked disk accepted by Cushing in the article referred to, appearing in the October number of the *American Journal of the Medical Sciences.*

For the pathology of retinitis-albuminurica, reference is made to the work of the writer as published in the March number of the *American Journal of Ophthalmology.* The condition is, as a rule, confined to the macular area of the retina, where profound changes may occur, yet associated with practically no involvement of the nerve head. The changes consist of an edema involving the entire thickness of the retina, with deposits of masses of exudate of a serofibrinous character, eventually undergoing hyaline metamorphosis. This condition may involve the entire macular area, without changes of any marked degree occurring in the disk. That such a condition could be due to intracranial pressure, resulting in a damming back of the cerebrospinal fluid along the meningeal sheath, the optic nerve seems untenable. According to the conception of the causation of choked disk, as given above. such a damming back would first result in an intense swelling and edema of the disk.

This is often not the case, even in the severest forms of retinitis-albuminurica. That the edema of pressure (choked disk) may eventually result in deposits of fibrin and hyaline in the surrounding retina is beyond doubt. But the pathogenesis of the two conditions is entirely different. If uremia with cerebral complications occurs in the course of a previously existing Bright's disease with retinitis (as in Cushing's case), then a true choked disk may be added to the picture, but from the standpoint of its pathogenesis especially, should be differentiated from the pre-existing retinitis. When such a condition occurs, the serious danger to sight and the intense suffering of the patient surely justifies decompression.

Discussion.—Dr. Carl Barck said that, so far as he knew, the first experiments were made along this line by his old teacher, Prof. Manz, of Freiberg. He was the first to demonstrate that this condition extended to the sheath of the optic nerve by injecting fluid into the arachnoidal space of animals. He, at that time, showed that the condition was mainly an edema. Afterward the theory that it was an inflammatory condition was advanced. The extension to the sheath led to interference to relieve the condition by an incision in the sheath. It was surprising how quickly the choked disk disappeared after the withdrawal of cerebrospinal fluid.

In the case of a lady with choked disk of about 4.5 diopters, removal of a piece of parietal bone, revealed a diffuse mass and about a handful was scooped out. The lady recovered, and a few weeks afterward the choked disk had entirely disappeared. She was perfectly healthy for several years, but later an atrophy of the optic nerve set in. The conditions in retinitis-albuminurica and choked disk were microscopically entirely different and until more was known about the causes of nephritis it would be difficult to make any definite statements.

Dr. John Green said that Dr. DeSchweinitz took an optimistic view of the decompressive operation in the matter of saving sight. Dr. Green had observed a number of cases in which this operation had been performed and his feelings was that the optimistic views of DeSchweinitz were perhaps too optimistic. Where atrophy had begun, the best to be hoped for was a cessation of the process, although DeSchweinitz had reported cases in which there had been sudden restoration of vision.

Dr. W. W. Graves had hoped that Dr. Semple would tell them something about the differentiation clinically between neuro-retinitis from choked disk. He had been told that it was sometimes difficult to make this differential diagnosis and Cushing had said that this differentiation could not be made, but Cushing was not an ophthalmologist. Dr. Graves had recently examined a patient where the diagnosis hinged upon the possibility of making this differentiation. Cerebellar tumor had been diagnosed and there was a staggering gait and headaches, but there had been no vomitting. The opinion given by the ophthalmologist was that it was undoubtedly choked disk and the gentleman who had seen the case before Dr. Graves, thought there could be no doubt about it being a brain tumor and advised a decompressive operation. While this patient had the symptoms of tumor, not a single motor cranial nerve showed the slightest involvement. The case was seen by Dr. Williamson and Dr. Green, and the consensus of opinion was that it was a retinitis with choked disk. Dr. Graves thought that the symptoms could not be accounted for on the basis of intracranial pressure and that it would be impossible on the basis of the neurological symptoms to consider it a case of brain tumor. Yet this woman had been urged to submit to a decompressive operation.

Great care should be exercised in making the differential diagnosis, for however valuable a decompressive operation might be, one would not care to subject a patient with a neuro-retinitis to such a procedure. It was undesirable to subject a patient to such an operation where a lumbar puncture would do as well. Where a tumor was growing from the cerebellum the sudden relief from pressure by lumbar puncture might produce interference with the respiratory center and result in sudden death. So from a clinical standpoint it was very important to make the differential diagnosis from the fact that the therapy must be founded directly on the diagnosis.

Dr. M. A. Bliss said that the first thing the neurologist did in these cases was to call on the ophthalmologist for help, as their training was not sufficient to enable them to recognize the condition. He had seen the case that Cushing operated on last fall. The girl was about 17 years old. His impression was that the nervous symptoms were almost identical with those produced by ordinary cerebrospinal pressure. But the girl got very much better and the condition improved immediately following the operation. Lumbar puncture was done subsequently. In the case of a patient seen by Dr. Semple and Dr. Alt, both of whom reported marked swelling, a lumbar puncture was done immediately after the bone was removed. The pressure was very great and there was almost immediate relief. In a few days the pulse rose from 40 to 68 or 70. In ten days the wound had healed and a second lumbar puncture was done and still later a third; and there had been a continuous improvement in the fundus. Apart from the symptoms of pain, where there was no localizing symptoms, a careful watching of the fundus made it possible to forecast the condition and be ready to relieve the pressure when it came.

Dr. Semple said that the changes in the fundus in the case mentioned by Dr. Bliss were very interesting. There had been at first merely a diffuse edema of the disk with a little swelling, but the day before the operation there was a typical choked disk. There was edema giving a striated appearance along the course of the blood-vessels, and after the operation the swelling and edema of the disk rapidly decreased until now there was merely the appearance of a slight hyperemia, although in the retina numerous hemorrhagic spots remained, but less in extent than at the time of operation. The veins had regained much of their normal appearance and the vision was now normal.

Keratitis Punctata Superficialis.

(By Dr. Meyer Wiener.)

On November 5, 1907, Miss B., age 21 years, came to me complaining of a sense of irritation in the right eye and of constant tearing. She was wearing O. D. + 0.75 cyl. ax. 0°, O. S. + 0.50 cyl. ax. 75°, prescribed by me about seven months before. Visual acuity: O. D. 14/15; O. S. 14/12; whereas it had been 14/12 in either eye at the time glasses were prescribed. There was slight injection of bulbar conjunctiva O. D., with a little roughness of palpebral conjunctiva of upper lid. On close inspection with oblique illumination, cornea was seen to be studded with numerous small, round, grayish dots about 30 in number, averaging about 1 mm. or less in diameter and raised above the surface of the cornea. These could only be seen by oblique illumination or by most careful inspection in daylight.

These spots were located mostly in the center of the cornea and seemed to lie in the most superficial layers, involving only the epithelium or the epithelium and most superficial part of Bowman's membrane. The spots were not sufficiently opaque to interfere at all with a view of the fundus which appeared normal. (The left eye was in every way normal.) The eye was cocainized and scrapings taken from a couple of these little elevations and one gelatine and one agar tube inoculated. The tubes remained sterile.

An antiseptic solution was given the patient to drop in the eye at home, and an antiseptic powder was dusted into the eye, at first daily and then less often. Also cold applications used to reduce the conjunctival irritation.

The elevated spots seemed to disappear rapidly enough, but left grayish dots which yielded more slowly to treatment. On January 3, 1908, scarcely a trace of these dots could be seen, and on January 18, when the patient was again seen, the cornea was perfectly clear with a visual acuity of 14/12.

This case answers the description of those cases reported by Major Herbert, of Bombay, more closely than the superficial punctate keratitis described by Fuchs. Also those of Herbert were mostly in young girls, as in this case, and mostly monocular.

It must be rare in these parts, as neither my associate, Dr. Wolfner, in his wide experience, nor myself had ever seen a case answering exactly this description.

Discussion.—Dr. Muetze had seen three cases of true punctate keratitis, one, a young peasant girl, whom he saw in 1895, got well in about four weeks. The second case he had seen regularly every year for the last four years. The right eye became affected about the same time each year, and each time there was also an attack of influenza. The third patient was a young girl. The attack was milder than the first case and the patient got well in about four weeks. This condition always left the cornea intact, while in true herpetic conditions the cornea was permanently affected. This condition was below Bowman's membrane, while the herpetic condition always affected Bowman's membrane. The second case mentioned was very severe, the patient suffering intensely during every attack. The condition was very rare in this country.

Dr. W. H. Luedde had seen one case which at times was superficial; and the spots would break upon the surface, but at other times the spots were deeper in the epithelial layer. There seemed to have been an iritis. The condition had existed a year or two. There was some adherence of the iris to the lens. Under treatment the vision improved somewhat. One little spot came to the surface and smears were made, but nothing came of the microscopic examination. There was a history of luetic taint in the family. Under one-fourth grain doses of bichloride of mercury the patient improved and the case seemed to be going on to a cure. There was no evidence of cyclitis and no involvement of Bowman's membrane.

Dr. John Green, Jr., asked if the elevations were connected by lines, as in all other respects the case resembled one of malarial keratitis.

Dr. Wiener, in conclusion, said that one reason why he had reported this case aside from its rarity, was the thought that perhaps instead of its being a rare condition it merely seemed to be so. The vision never went below 14/20, and there was only lacrimation and occasionally the feeling of a foreign body.

The spots could be seen most clearly when they were getting well. According to DeSchweinitz, in the cases of punctate keratitis reported by him, the lesions were sometimes connected by small lines, but in his case they were not connected. If these cases were so common in India, it would seem that more of them would be seen here.

Meeting of June 10, 1908. Dr. A. E. Ewing, presiding.

Regeneration of the Cornea.

(Report of Case by Dr. Henry L. Wolfner.)

Mrs. T., aet. 32, presented herself for treatment with gonorrheal ophthalmia O. D.; O. S. had been enucleated in childhood, and she wore an artificial eye. Socket of O. S. was also infected with gonococci. When first seen there was ulceration of the cornea O. D., which progressed until in seven days entire cornea down to Descemet's membrane was destroyed. Dr. Wolfner did not believe there was any hope of preserving vision, and Dr. Alt, who saw the case in consultation, was of the same opinion. Treatment consisted of flushing the eye with a 1:5000 bichloride solution and dusting in xeroform powder. Potassium iodide was given internally. Regeneration set in, and as a final result, there is a clear cornea, except for a faint cloud just below the center; slight tendency toward keratoconus and small deposit on anterior capsule. One small posterior synechia. Vision, 14/120.

Discussion.—Dr. Post thought that possibly the elimination of the iodine in conjunction with the xeroform had something to do with the clearing up of the cornea.

Dr. Williamson asked how long this regenerative process continued.

Dr. Wolfner replied that the cornea was practically regenerated within six weeks or two months, but it was not perfectly clear at first. It continued to clear up until about a year ago. Since then there had been no change.

Cataract Operation Complicated by Dacryocystitis.

(By Dr. M. H. Post.)

Dr. Post reported a successful cataract extraction in a case in which dacryocystitis had long existed. The danger of operating in such cases had been impressed on Dr. Post many years ago by watching a most successful operator perform an extraction in an eye in which a small particle of pus was present at the inner canthus. The eye being subsequently lost. And when his present case, a woman, 64 years old, presented herself to him with well-marked cataract and dacryocystitis, O. D., and commencing cataract O. S., he had to consider seriously the best surgical measures to pursue. He considered tying the puncta, destroying them with galvano-cautery, and extirpation of the sac. When first seen there was considerable discharge from the lacrimal sac into the conjunctival sac, and also some discharge through the lacrimal fistula onto the face. Cultures from this discharge showed only a scant growth of encapsulated pneumococci.

An effort was made before operation to relieve this condition. The upper punctum was slit and Bowman probes up to No. 3 passed into the nose. Injection of argyrol, 20%, and normal saline solution passed out through the fistula. This treatment was continued for two months without any improvement, and the patient went home. Eight months later she demanded operative relief. Obliteration of the lacrimal sac seemed too severe an operation for a patient so feeble, so the canaliculi was ligated. Daily cultures made from the contents of the conjunctival sac showed staphylococcus albus. After cleansing the conjunctival sac as thoroughly as possible the lens was extracted with iridectomy through an incision in the upper portion of the cornea, care being taken to leave a large conjunctival flap. The sac was then washed out with normal saline solution and filled with 25% solution of argyrol. Both eyes were then covered with absorbent cotton pad, saturated in 1:5000 bichloride solution and the whole held in place with a Ring mask. As soon as possible washing out of the lacrimal sac, night and morning, was instituted. Final visual result 20/30.

Dr. Post called attention to a paper by Dr. Bull, in which he stated that in the presence of suppurative disease of the lacrimal passages, all operations on the eyeball are positively contra-indicated. The lacrimal sac must be excised, or the puncta obliterated by the galvano-cautery before any operation on the eyeball can be undertaken. Dr. Post did not entirely agree with Dr. Bull in this statement. He thought cases might arise in which such radical measures were inadvisable.

Dr. Post believed the two factors producing the good result in his case were: first, ligation of the canaliculi, and second, the fistula condition of the lacrimal sac which allowed drainage downward. Probably the best way of ligating the canaliculi is to pass a very fine probe into the canaliculus, then having passed a needle carrying the ligature through the lid, the ligature is tied down on probe,the probe withdrawn and the ligature tied.

Discussion.—Dr. Meyer Wiener reported a case almost the counterpart of Dr. Post's. The patient, a man 81 years old, had a dacryocystitis and cataract. The other eye had been operated on for cataract a year before with excellent result, but six months later he had lost the eye from an attack of acute glaucoma. Dr. Wiener treated the dacryocystitis and tried to get rid of the pus, but did not altogether succeed. The man was weak, he needed to get out into the fresh air and was unable to do so except when he could find someone to accompany him. For this reason it seemed that something must be done. Both puncta were tied off with black silk thread and two or three days later an extraction of the lens in the capsule was performed. The eye healed without any complication. The resulting vision was 14/30. About the tenth or eleventh day after the operation pus began to form again, but fortunately it did not infect the wound, and the result was a very good eye.

Dr. Llewellyn Williamson thought that in a case of this kind, while the ligation of the puncta was the simplest procedure, an excision of the sac should be seriously considered, for there was the possibility of an overflow of pus into the conjunctival sac, and he could think of nothing more disastrous than an infection or even a corneal ulcer in such a case, especially where the patient had but one eye left. For this reason he considered an excision of the sac the wisest procedure in cases of this kind.

Dr. Post said that in Dr. Wiener's case and in his own an extirpation of the sac would have to be considered very seriously before attempting it. His patient had had asthma and was very nervous and it was questionable whether she would have come through such an operation, although, of course, there was on the other hand the possibility of blindness to be considered.

A New Knife for Dividing Membranes Obstructing the Pupil After Cataract Operations.

(By Dr. M. H. Post.)

Having sometimes experienced considerable difficulty in attempting to divide obstructing membranes of the pupil with the ordinary knife-needle, Dr. Post had devised a knife for this purpose, which he presented to the Section.

The blade 6 mm. long and 1 1/4 mm. wide at its widest part, about 3 mm. from the point, has its back straight and dull, and a sharply rounded cutting edge extending its entire length. The shank is cylindrical, and of a diameter sufficient to prevent the escape of aqueous during the operation. The width of the blade is sufficient to admit of its cutting edge being ground very sharp, which is important.

Discussion.—Dr. A. E. Ewing said that he had made it a rule with this new instrument to go further into the cornea than it had been his custom to do formerly when he had used the Knapp straight needle and the sickle needle. With this instrument he went in near the iris with a slow sawing movement and usually the result was a fairly good opening. After passing in the instrument one could cut entirely across the pupil, then turn the knife down and passing over it gave on the whole cutting length 3 mm. or 4 mm., and when finished the opening would be 6 mm. or 7 mm. long. More than that, the needle so filled the wound that the aqueous could not escape, and one might turn the needle and make a cut from above or below as desired. Within the last two or three weeks he had divided two tough membranes, cut through an atrophic lens and separated a very tough membrane from the iris. In this case he had separated it from the iris on the temporal side the full length of the knife, then caught the membrane with the hook and drew it entirely through the wound and cut it off with the scissors. The result was a beautifully clear pupil. After passing the knife on the flat, it should be turned over. In his first case, an exceedingly tough membrane, the patient acted badly and jumped against the needle and he had made the mistake of not turning the knife, and as a result cut through the iris as the knife was withdrawn. One should bear in mind that the knife must be turned back so as to have the width of the knife in the plane of the iris. In all the cases where he had used this knife he had gotten a perfect result, a large opening, a beautifully clear pupil. In the case of the atrophied lens he had thought he would see what this knife would do. Entering from the temporal side the knife was passed into the lens and a perfectly clear opening was the result. As he failed to get quite the opening desired on withdrawing the knife, he had gone in a second time. The eye was now perfectly quiet and getting well.

Dr. Alt, after seeing Dr. Post's knife, had had some made, although he believed his had a slightly different curve than appeared in the drawing by Dr. Post. It worked exceedingly well, because the knife was extremely sharp. It cut splendidly and the opening in the cornea was perfectly blocked so that there was no escape of the aqueous.

Dr. Wiener thought that the operation of capsulotomy was a very serious one. The best results that he and Dr. Wolfner had secured had been with the Ziegler operation, making a V-shaped incision with a sawing movement. He believed this sawing movement was the secret of getting through tough membranes.

Dr. Post demonstrated a mouth bib of gauze.

Discussion.—Dr. Alt said that since February, when a patient, upon whom he had operated, developed an infection at the same time that he had developed a tonsilitis, bacteriological examination showing both to be due to the pneumococcus, he had been using a bib. He had found that with the glasses it was in his way, as he stooped over the patient his breath dimmed the glass. But he would never again operate without a bib. He thought that a piece of sterile gauze used once and thrown away better than a mask to be used over and over again.

Dr. Ernst Saxl said that covers for the mouth were not of recent date. The most practical one he had seen was one used in Vienna for seven or eight years. It looked like an oval chloroform mask. It fitted over the nose at an angle, like a chloroform mask, leaving the eyes free, and it fastened with spectacle hooks over the ears. It was simple, easily sterilized and easily attached.

LLEWELLYN WILLIAMSON,
Section Editor.

ABSTRACTS FROM THE TRANSACTIONS OF THE OPHTHALMOLOGICAL SOCIETY OF THE NETHERLANDS, 1907.

Translated by D. A. KUYK, M. D., Richmond, Va.

Permanent Drainage of the Lacrimal Sac and Duct.

(Prof. Koster.)

That the therapy of the lacrimal apparatus is far from satisfactory is evidenced by the frequent performance of extirpation of the sac and sometimes of the ducts even. It is necessary therefore to search for a method of treatment that will preserve the functional integrity of the entire drainage system of the eye. Since 1906 I have employed the method of more or less permanently placed silk thread left within the drainage system. I use hollow metal probes, the size varying with the necessities of the case, into which fits a solid metal bar having an eye or depression at the distal end into which the thread (silk is employed) is inserted.

The largest possible hollow sound is passed, then the bar loaded with the thread is passed into this until it impinges upon the floor of the nose. Then a nasal probe having a delicate hooked end is passed along the floor of the nostril until it reaches the posterior choana. The hook is then turned outward, brought forward beneath the inferior turbinate, and the thread sought for. When found it is brought forward, out of the nostril and securely held while the carrier and sound are removed.

The nasal end is tucked away in the nostril, while the ocular end is knotted and placed in the inner canthus or secured upon the face. Once or twice daily the ends are removed for cleansing purposes or the thread is withdrawn as far as seems safe, treated with a suitable medicament and returned to its original position within the duct and sac, thus securing continuous instead of occasional medication, as is the case with irrigations or injections. The advantage of this is obvious.

The thread must remain in situ until all signs of discharge of any character whatever disappear, and until there is complete absence of all irritation symptoms. In one case the thread was allowed to remain in one position for two months with the most gratifying results, but in most cases three or four weeks will be found sufficient. Some cases show marked improvement in a few days. This treatment has been employed in frequently recurrent dacryo-blenorrhea; in chronic dacryo-cystitis with fistula; dacryo-stenosis with exposed necrotic bone; recurrent stenosis and traumatic stenosis. But for the unsightliness of the exposed thread, the method could be used in all cases, but some people object to any discomfort or unsightly appearance.

Prof. Sraub gave a short description of *LaGleyzes' operation for ectropion.* He has employed it with the most satisfactory results.

After cocainization of the lower lid, an incision is made parallel to the ciliary margin and about 2 mm. distant from it, extending the full length of the lid, thus mobilizing it so that the everted lid assumes its normal position. A second incision is then made parallel to the first, and from 1.5 to 2 mm. from it. The lid between the two incisions—the bridge of tissue—is then divided by an obtuse incision at the center. The flaps are now dissected from the underlying tissue and stitched. Stretching the flaps shortens the distance of the skin graft. This contraction is of the greatest importance, as by this means the lower lid is replaced to its normal position. Snellen's entropion thread may be employed to maintain the reposition of the lid.

Dr. V. Geuns reported *an unusual affection of the retina.* The condition was first noticed on the twenty-first day of February, 1904, when the papilla and macula were surrounded by a ring of exceedingly fine dots existent in the retina. The condition slowly advanced until February 8, 1905, the dots had coalesced forming a moderate sized white band with an occasional openings—*islands,* through which the red reflex of the fundus was visible. A second band surrounding the macula and papilla is in the course of the formation, in the horizontal meridian bisecting the first. Beginning on the nasal side, it now includes the macular region, and extends over to the temporal side. The initial appearance is identical to that in the first band; the dots are in process of coalition.

The lower field counts fingers at 5 m. Color vision in the field is more acute then in the normal eye. There remains only

l. p. in the periphery. He expected that the condition would have continued to spread until the entire retina would have become involved, but the case pursued an unexpected course. Patient was not again seen until December 15, 1905. The retinal deposits between the first discovered white ring had entirely disappeared except two small star-shaped pigmented deposits from which radiated a number of yellowish striae.

The upper part of the white ring (the original ring surrounding the papilla) had to a great extent been absorbed, leaving behind a yellowish discoloration with numerous pigment deposits; the temporal portion is likewise lighter, leaving a grayish discoloration. The nasal portion had assumed a grayish tint, flecked here and there with small islands of red chorioid. Within this part of the band two small hemorrhages had occurred, the vena nasalis inferior not far from the papilla being hidden by a hemorrhage. On the temporal side was another small hemorrhage spot. In the macular region the white discoloration was much smaller, only one white spot beneath the macula remaining. Vision remains as before.

Since the last examination the exudation has slowly resorbed, the pigment epithelium has become more atrophic, the blood vessels, especially the arteries, have become smaller. In the lower part of the retina the chorioidal vessels are distinctly seen while the intervascular spaces are highly pigmented. Some of the vessels show a tendency to become sclerotic.

The remnants of the white band on the temporal side and continuing downward appears yellowish white. The nasal and upper sectors present the same appearance with the addition of numerous exceedingly fine pigmented stripes. The macula itself appears irregular, otherwise it seems quite normal. The remainder of the several patches of deposit have entirely disappeared. Central vision is remarkably improved, being now one-sixtieth. In passing, he reported that during 1906, mercurial treatment was employed, but proved totally useless.

Concerning the etiology, nothing is known. The possibility of arthritis, lues or tuberculosis was considered, but the history was negative. An extensive search of the literature had been made, but nothing approaching a similar condition could be found.

BOOK REVIEWS.

The Muscles of the Eye.

By Lucien Howe, M. A., M. D., Buffalo, N. Y. Published by G. P. Putnam's Sons, New York. In two volumes. Vol. II.

The second, and last, volume of Dr. Howe's book on the muscles of the eye comprises the Pathology and Treatment. Many chapters are given to the consideration of the etiology of muscular abnormalities, and in the opinion of the reviewer some of these are the strongest in the book.

It is a great comfort to find in this work (the first volume of which has received so much praise, both at home and abroad), that the views of the author concerning the relationship between eye-strain and systemic conditions are those held by the majority of ophthalmic surgeons in America.

In the chapters on Symptomatology, one could wish for a more detailed description of the methods for determining the affected muscle. While we might agree with the author that the tests for the recognition of general causes of imbalance require only a comparatively small outlay in the way of apparatus and reagents, we would differ from him in advising that ophthalmologists undertake this work, as it seems to us that many of these tests properly belong to the province of the physiological chemist, because of the technical skill required and the experience necessary in order to draw proper conclusions.

In the chapter on Operations, the most satisfactory methods are described; among these is an original operation for advancement in which the sutures are anchored, not in the sclera, but in the tendon of the superior and inferior rectus muscles.

Considering the work as a whole, it reflects credit on the author. It is a comprehensive and clear presentation of a difficult subject. Every chapter bears testimony to the author's originality, scholarly attainments and conscientious research.

W. Zentmayer.

Spectacles and Eye-Glasses, Their Forms, Mountings and Proper Adjustment.

By R. J. PHILLIPS, M. D., Philadelphia. Fourth Revised Edition. P. Blakiston's Son and Company, Philadelphia, 1908. Price, $1.00.

The author presents the fourth edition of this treatise thoroughly revised to date. As in previous editions, his purpose has been to deal with the practical rather than the theoretical side of the questions involved, and in this he has been entirely successful.

For those practicing away from the centers where opticians are mostly jewelers and middlemen, the book should prove invaluable. and for others more fortunately located, a knowledge of its contents will ensure better results in rendering patients the greatest service.

Following an interesting introduction upon the History of Spectacles, the book includes chapters on General Considerations; the Principles of Spectacle Fitting; Prescription of Frames; and Inspection and Adjustment of Spectacles and Eye-glasses.

We know of no book which so well satisfies the wants of those interested in this particular line of work. It covers a detail of ophthalmic practice, which although important, is too frequently neglected.

WILLIAM T. SHOEMAKER.

NEWS AND NOTES.

Commencing with the present issue of the Annals, announcement is made of the following changes in the editorial staff:

Dr. Clarence Loeb, of St. Louis, has assumed charge of the French Abstracts, and has associated with him Dr. M. W. Frederick, of San Francisco, and Dr. Llewellyn Williamson, of St. Louis.

Dr. Edgar S. Thomson of New York, Dr. Nelson M. Black of Milwaukee, and Dr. W. Gordon M. Byers of Montreal, Canada, have joined the department of English and English Colonial literature; and Dr. Meyer Wiener, of St. Louis, succeeds Dr. Loeb in the department of German literature.

A Correction.—The legends of Fig. 2, page 651, and Fig. 2, page 659, October number, in the contributions by Drs. Quackenboss and Verhoeff, upon Angioma of the Chorioid and Angioma of the Orbit, have by mistake been interchanged.

The legend for Fig. 1, page 655, same issue, should read, "Photograph of Sectioned Tumor," etc., and not "Photograph of Sectional Tumor," etc.

The following circular letter has been received, and it is to be hoped that those who are in a position to furnish information upon Glass Workers' Cataract, will communicate with the Royal Society's Committee:

London, Eng., November 18th, 1908.

Dear Sir:

The Royal Society has appointed a committee, of which I am a member, to investigate Glass Workers' Cataract. We are desirous of obtaining information as to the incidence of the disease in Canada and the United States of America. More particularly we wish to ascertain the relative frequency of the typical form of cataract—a small disc-like opacity in the posterior cortex of the lens—in the various branches of glass manufacture. The condition is common among bottle makers (not makers of flint glass bottles) in England, but we are doubtful as to its prevalence among pressed glass workers. We understand that in America an extremely hot oil furnace is used by the "melters" in this form of glass manufacture.

We should be greatly indebted to you, therefore, if you could give us any information on the subject, more especially—

(1) As to the incidence of the specific form of cataract among (a) Bottle Makers; (b) Pressed Glass Makers; (c) Plate Glass Makers.

(2) As to the use of recent inventions in the manufacture of these types of glass and their nature—particularly as to the fuel and temperature of the furnaces employed. I am, sir,

Yours faithfully,
J. Herbert Parsons,
27 Wimpole St., Cavendish Square.

THE ANNALS
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INFLUENCE OF THE EYE ON THE EAR UNDER NORMAL AND PATHOLOGICAL CONDITIONS.*

DR. MARCEL ROLLET,

OF BLOIS.

Translated from *The Revue Hebdomadaire de Laryngologie, D'Otologie et de Rhinologie.*

BY F. PARK LEWIS, M. D.,

BUFFALO, N. Y.

It was only within recent years that direct relationships were found to exist between the two most important organs of special sense, and few authors, in France more particularly, have given any attention to this subject whatever. In the classical text-books there is no reference even to the possibility of a correlation which might exist between the eye and the ear.

It has, of course, been known many years that relationships exist between these two organs through the medium of the nasal fossae because there exists between the two, direct communication by way of the lacrimal canal and the

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*Read before the Society francaise d'oto-rhino-laryngologie, May, 1907.

Eustachian tube, but the fact is not pointed out that with the trifacial innervating at once the eye and the ear a lesion or a simple impression involving one of the two organs can through these passages affect the other. This medium, moreover is not the only way through which the one may involve the other.

"The most marked connections between affections of the two most important organs of special sense," says Rohrer, "are encountered in the domain of neuropathologic disturbances of the sensorial functions." The abundance with which the ears are supplied with nerves, the influence of the vasomotors, of the pneumogastric and the sympathetic, the numerous ganglia in their connection with both motor and sensory branches connecting with the trifacial, the facial and the glosso-pharyngeal, the correlation of the reflex centers of both the optic and auditory nerves, and finally, the influence both common and intimate of these two nerves on our position in space, give abundant explication of the existing frequent synergies observed both from the physiologic and pathologic point of view.

Laurens (in his Thesis, Paris, 1897) has made a complete and general review of this whole question. He has demonstrated that physiological experiments have definitely shown that direct relationship exists between the eye and the ear. The researches of Cyon, Urbantschitsch and others on the semicircular canals have determined their physiological functions and their influence on ocular movements, and then clinical observations have supported those obtained through physiological experimentation and have shown that pathological conditions of the eye can affect other organs, as the teeth, the nasal fossae and sinuses, or even those more distant, as the kidneys, the heart, the liver, the uterus, etc.

"But it is remarkable," says he, "that a series of organs should be recognized, innervated by the trifacial (the eye, the nose, the sinuses, the ears, etc.) through which affections may be directly carried to neighboring systems, and that in this connection the ears have been neglected and the relations that may exist between the eye and the ear have been completely ignored. Nevertheless, all of the organs mentioned above are placed in a circuit innervated by one given nerve, the fifth pair. Let one of the organs in this circuit be involved and the affection may be carried to a neighboring one and in each instance in which we have a pathological condition of the nose (hypertrophic rhinitis, polyps, etc.) there may follow a reflex ocular trouble (blepharospasm, asthenopia), while dental caries may be a provocative cause of an otalgia or disturbance of vision, etc., as numerous instances which have been cited clearly show."

For a long time this contro'ling influence of the trifacial over oto-ocular disturbances was unknown. Optic neuritis was indeed almost the only ocular trouble that was recognized as the result of a lesion of the ears. Later it was observed that nystagmus, hemianopsia and ocular paralyses were found in certain cases of middle ear disease. The observations that blepharospasm (Rampoldi, Buzzard) followed an irritation of the external ears then determined that the trifacial participated in such incidents. Instances of myosis, of disturbances of accommodation (Politzer, Urbantschitsch), of contraction of the field of vision, of diminution of visual acuity, of hemeralopia in connection with disturbances of the ears have all been observed and noted, but in each instance the phenomenon had the ears as the point of origin.

"The inverse phenomena, much less important, and of which but few instances have been reported," said Laurens, "are not pertinent to this summary," and indeed his observations relative to them occupy but two pages.

It is this question, however, that I would especially take up. I was led to study this phase of the question after having observed a case widely different from the observation cited by Laurens, and the researches which I have undertaken have brought to my notice several other cases which for the most part have been published out of France.

As Laurens has done, I have eliminated completely from my subject the consideration of general maladies or diatheses, which in some way not infrequently localize their effects at the same time in the two organs of special sense. I have eliminated also cerebral tumors which by compression of the cranial nerves cause simultaneously auditory and ocular troubles, but which may be quite independent the one of the other. The field of inquiry is thereby considerably narrowed, for, as Politzer has observed, under those general conditions in which are found to exist affections of the eye and the ear, their presence is for the most part due to the existence of a common factor such as atmospheric influences, scrofula, syphilis, acquired or hereditary, etc. (Rohrer.)

But first I will note the observation that led to the consideration of this work.

Case. Mrs. L., age about 50 years. Came to consult me concerning her eyes in 1903. She had a high degree of myopia with muscae volitantes. In the eyeground were large posterior staphylomata with imperfectly limited chorioidal lesions, together with floating bodies in the vitreous. It was a marked case indeed of myopic chorioditis. As for the myopia it required 15 dioptres for its correction, and there was also present astigmatism.

When the acute condition of chorioidal inflammation had subsided the following correction was given after an examination with the Javal ophthalmometer:

O. D. — 16. D. S. $\overset{\frown}{\smile}$ — 3. D. C. 30° V 5/10.
O. S. — 15. D. S. $\overset{\frown}{\smile}$ — 2.50 D. C. 150° V 5/10.

The patient was advised to wear glasses in accordance with the above findings for occasional distant vision, while considerably weaker ones were given for constant use.

These glasses were worn with comfort and gave very excellent vision.

Eighteen months later the patient again consulted me, complaining of visual fatigue. For some time past the lady had been passing through the climacteric. Had had frequent hemorrhages and had become exceedingly anemic and was exceedingly nervous.

The myopia and visual acuity had remained unchanged, the condition of the eyeground had remained stationary and there were no new chorioidal patches. But I was not a little surprised when I undertook to make an examination with the ophthalmoscope, to see my patient put her hand to her ears complaining of ringing in the ears, which ceased only when she turned away her head and shut her eyes. I persisted, however, in making an examination of the eye. Then not a little astonished at the reaction which I had never before observed and concerning which the authorities make no mention, I began some researches and had my patient come again some two weeks later in order that I might be assured that the phenomenon still persisted, to more carefully analyze it, and more especially to examine the condition of the ears.

On further examination I assured myself that the roaring (bourdonnements) was produced as intensely as before when the reflected light from the concave mirror penetrated the eye The humming or buzzing of which the patient complained she compared to the noise of the wheels of a carriage passing over sand. It was produced on the two sides independent of the eye examination. The disagreeable sensations, however, were accentuated in the ear corresponding to the eye which was being examined.

The noises commenced when the light penetrated the eye, and ceased when the patient turned away the head and shut the eyes, no longer being able to endure the effect on the retina of the bright light.

An examination of the ears gave the following results: Weber indifferent. Rinne +. Schwabach lightly diminishing on both sides. Watch heard normally at 40 cm., was heard by the right at 8 cm., on the left at 20. Both membranes gave evidence of beginning sclerosis.

It was here quite evident that we were dealing with a reflex, but the trifacial, unlike the cases which had been previously collected, did not seem to be involved. So having to consider the symptoms which I had observed and as a basis of further comparison I will summarize the observations which have already been made and the deductions which have been drawn from them.

Almost always in the relations between the eye and the ear, it would seem that the phenomena are of reflex origin. One single case, that of Moos, seems not to fall under this head. "This morbid combination of the two highest sense organs, I must say, is exceedingly rare," says he. "I have not found any reference to such conditions in medical literature, and in my own experience I have had but one case. This I found in consultation with Prof. Schiff at Florence. An Englishman living there had had a bilateral extraction of cataract in harmony with all the rules of practice. It was followed by bilateral panophthalmitis and extension of the inflammation to the base of the brain, and this was followed by blindness, and finally by deafness on both sides." (Moos.)

In the presence of a meningitis of the base it is evidently not necessary to consider a reflex in explanation of the total deafness following.

In relation to the other observations where reflex phenomena have been considered, the origin may be an ocular inflammation spontaneous or traumatic, it may be a muscular contraction (orbicularis or muscles of the eyeball), or static trouble, or it may be simply a luminous sensation, generally intense.

The reflex which most commonly affects the action of the trifacial may produce in the ears the phenomenon of inhibition (deafness) or it may produce the phenomenon of excitation. There is then the tinnitus which may be present associated with deafness. Several times there has been noted vertigo accompanying the deafness and tinnitus.

I will classify the observations which up to the present time have been reported, in three groups where the reflex which produces a disturbance of the ear has for its origin one of the eyes:

1. An inflammation.
2. A muscular contraction or static disturbance.
3. A luminous impression.

I. Reflexes having for their origin an inflammation of the eye.

In this first group, outside of the inflammations properly so-called spontaneous or traumatic, I include also those glaucomatous accidents of which certain observations have been made, and which have resulted in a disturbing influence on the ear; conditions which have their analogy in those produced by inflammations. The larger part of the first group has been published by Laurens in his thesis.

De Capdeville has reported three cases. The first observed is that of a woman, aged fifty-six years, who after some temporary disturbances of vision in her left eye had an acute attack of glaucoma with all of the classic signs. The patient absolutely refused any surgical intervention, and would permit only instillations of eserine. After a number of alternating attacks of increased tension with violent ciliary pain followed by lowering and then bettering of the vision, after a final crisis (the patient not having been seen until two months later), all perception of light had disappeared from the left eye. This was followed by a period of irritation of the ciliary plexus with extreme sensitiveness to touch, with attacks of pain supervening from time to time, and persisting for from five to six days with entire loss of the anterior chamber, discoloration of the iris and all the signs of profound nutritive trouble of the eye which must sooner or later result in its atrophy.

It was during the course of this third period that the left ear began to give evidence of functional trouble. A sensation of noise was experienced, subject to variations in character and intensity, passing alternately from a rapid rhythm to one more slow, without having any relation to the condition of the circulation, painful sensitiveness to vibrations in the auricular region not modified by pressure with the finger on the walls of the canal, or by repeated attempts at forcing respiration or deglutition; vertiginous impulses especially in the morning on getting up, with a tendency to fall toward the left, and marked diminution in the hearing on that side where words, even when the voice was raised, were heard with difficulty. Test with the watch gave negative results, equally so whether pressed on the ear or over the temporal bone on the right or on the left. An examination of the external ear showed the tympanic membrane to have a grayish color somewhat like that of old dry parchment, but the other ear showed absolutely the same condition. No abnormal vascularization. No evidence of disturbances of the throat or the post-nasal region.

This condition continued through three months without it being possible in any degree to modify it, and without it being possible to make the patient permit enucleation of the left eye. By good fortune the right eye and the right ear remained normal. At this point the author lost sight of the case.

In the second case reported by Capdeville the patient was a blacksmith, into whose left eye had been driven an iron chip. It penetrated the cornea at the edge of the sclerotic at the outer side of the eye. The iris was detached, and there was an extensive hemorrhage in the anterior chamber. The foreign body was immediately extracted, and with it came a gush of aqueous humor with a serous sanguinolent fluid. The margins of the iris adhered to the edges of the wound.

The next day the blood was in great measure absorbed, and it was possible to see through the pupil, which had been dilated with atropine, a milky opacity extending across the surface of the crystalline lens. The traumatism had involved the lens and also the ciliary body, as was indicated by the peripheric position of the wound. There was redness and moderate sensibility of the globe, with total absence of vision but perception of light.

On the days following, the swelling of the crystalline was evident. The periorbital pains with intense redness around the cornea and subconjunctival edema gave evidence that in the outer section of the globe was a beginning iridochorioiditis. This condition had reached its highest development on the twentieth day after the accident. It was no longer possible to retain any illusions as to the unfortunate outcome of the accident.

At this time began to be manifested certain troubles of the left ear, troubles to which the patient, tormented by his ciliary pain, had not before this given any attention. Their persistence even during the periods of relief from the pain in the eye served to show the relative increase in the deafness which had come on during the last few days, and more especially the incessant tinnitus and painful sensitiveness to sounds which had developed on this side. "It seems to me," he said, "that I have constantly a bee in active movement deep in the ear."

There was nothing abnormal in the ear canal, but on the tympanum there was a slight injection along the handle of the malleus. The sound of a watch on the left was heard at only ten centimeters, while on the right it was heard at thirty. The patient showed nevertheless the relative deafness of the two ears, a painful sensitiveness to all acute sounds, and veritable hyperesthesia which obliged him to close the ear canal with a pledget of cotton.

Convinced that the inflammatory phenomena of which the eye was the seat entered in very large measure into the etiology of the auricular conditions, and finding moreover in the marked reaction of the ear an added reason for fearing the development of sympathetic trouble in the right eye, the author made an exact study of the functions of this eye. The results gave warrant for his fears.

One month and a half after the accident photophobia and watering of the eye began, the vision became less clear, a cloud more or less thick followed the effort made in taking the visual field, and the eye became readily injected.

Enucleation was proposed and accepted. On the following day all the subjective phenomena of which the ear and the left eye had been the seat had completely disappeared. In the ear this was the more remarkable in that for more than a month the noise had remained constant and incessant without marked variations. It was certainly more than a simple coincidence. Five or six days later the hearing had become normal, as shown by the watch tests taken repeatedly before and after enucleation, and giving an equal distance in the two ears.

Finally in his third case, de Capdeville reports that of a woman who, following extraction of cataract from the right eye, showed a small prolapsus of the iris in the angles of the wound. The course of recovery was quite normal, however. Slight cystoid protuberances remained at each end of the incision, the pupil was paraboloid, but entirely black, vision was clear.

Four months later there were manifestations of ciliary irritation with a degree of sensitiveness to light and a necessity of protecting the eyes by blue glasses. Then appeared successively and in the space of a few weeks, fugitive obscurations of vision, growing photophobia, pericorneal injection, becoming day by day more marked, and sensitiveness of the eye to touch, more particularly over the scar which had become the seat of a fine vascularization with grayish adhesions. It terminated in an attack of acute irido-cyclitis with all of its functional and anatomic signs—violent periorbital pains, almost complete loss of vision, reduction of the pupillary opening, which was markedly drawn downward, diffuse obscurities through the intraocular humors, and increased tension of the globe.

Some days after these acute symptoms had appeared the patient complained of tinnitus in the right ear, not intense in character but fatiguing by reason of its persistence. At the same time the hearing on that side seemed less acute than usual. Nothing abnormal could be detected in the ear on that side, although the watch was heard at but twenty-five centimeters, while on the other it was heard at one meter.

Revulsive and derivative treatment was without effect, and at the time that the symptoms became acute in the eye, the disturbances in the ear became intensified in character and took on a new form. The roaring continued with increasing intensity, the hearing on that side disappeared entirely both on contact with the watch over the external canal, and over the temporal bone, while to this was added a tendency to vertigo, more marked on raising the head from the pillow, and some degree of nausea.

For a fortnight following this there was an intermission of relief from the symptoms of both the eye and the ear, when a new attack of cyclitis caused a recurrence of all of the disturbances of hearing.

To this picture was added disquieting symptoms of the left eye, which had become cataractous. There was pupillary paresis, while subconjunctival vascular arborizations indicated a pathological condition yet latent, but which warranted apprehension of a coming attack of sympathetic ophthalmia.

For two weeks the condition became alternately better and worse. The field of vision of the left eye gradually became more restricted and at the same time the photophobia grew less. The right ear continued the seat of noises that by reason of their persistence became almost as distressing as the sharper ciliary pains. The hearing on that side had by this time become almost extinct.

Enucleation—long before this urged—was finally permitted by the patient. Immediately following the operation, on the day indeed on which it had been performed, the periorbital pains ceased *and with their disappearance was complete relief from the tinnitus and vertigo.* The hearing on that side remained as defective as before the operation. The condition of the left eye however did not improve, the perception of light grew less, and the tension diminished—indicating a beginning atrophy. Under these conditions all idea of any operative intervention was abandoned, and there remained only the consolation for the poor patient of having been relieved of the ciliary pains and aural noises that for two months had made life a torture.

Dransart has published six cases bearing upon this subject in the *Annals d'Oculistique.*

The first was that of a tinsmith 28 years old from whose left eye the author had extracted a chip of iron. The vision in that eye had been almost wholly lost since that time, and the young man could with difficulty guide himself. In the pupillary space were white opacities giving evidences of a traumatic cataract which had undergone absorption. The iris was adherent to the capsule at several points. Following a blow received upon the right eye the patient had immediately lost his hearing in the right ear. Several days later he announced that he had become deaf in the left ear and that the vision in the corresponding eye had appreciably diminished. The patient was an alcoholic and had alcoholic tremors.

An iridectomy was made on the right eye with the result of considerably improving the vision in that eye, and after some weeks the hearing was equally improved.

The second case was that of a boy nine years old, born of syphilitic parents and having diffuse keratitis in the right eye. Before this, his left eye had been similarly affected. This eye was flecked with nebulae, but was no longer the seat of acute inflammatory trouble. The child complained of deafness in the right ear. The deafness was coincident with the eye affection on the right side. When he had had pain in the left eye, the right ear had remained intact. He said that during the winter he had been struck by a snowball on the right eye, and that immediately following the injury he had become deaf, and the eye had become inflamed. The tick of the watch could be heard neither by aerial or bone conduction. The hearing in the right ear had at no time been affected.

In his third case a young girl of eighteen presenting multiple evidences of scrofula was both deaf and blind. In the right eye—lost in early childhood, hernia, scars on the cornea, and anterior staphyloma. The left eye had been lost since puberty (from iritis). Diffuse opacities in the cornea; sclerotic bulging; total synechia of the pupil.

Double iridectomy on left and right. A fortnight later the girl could see clearly and guide herself readily, and furthermore *she could hear with perfect distinctness.* The relief has remained permanent.

The fourth case was that of a child of eight, also scrofulous. Diffuse keratitis with posterior synechia right and anterior synechia left. General condition defective, white swellings on each knee. The child has been deaf since she was two years old and her vision was greatly reduced.

Double iridectomies, after which the child could both see and hear better.

In the fifth case Dransart reports complete loss of the left eye from trachoma, leaving a small atrophic bulb. The right eye presents abundant conjunctival granulations with ulceration of the cornea and pannus.

The patient, who has defective hearing, has frequently remarked that when his eyes were relatively well the hearing was better, but when they became the seat of acute inflammation the hearing diminished to a corresponding degree.

Finally, the sixth case was that of a journalist, 56 years old, having entropion of the right lower lid. The palpebral deformity occasioning frequent inflammations of the eye, the patient desired an operation. Following the operation the patient, who had been deaf since his eighth year, reported that he could hear perfectly well. He stated further that for a long time he had observed the bad effect of acute attacks of inflammation of the eye on the ear. When the eye reddened and did badly, he heard much less clearly. He heard much better, on the other hand, when the eye was not so red.*

Bouchut relates the following case: A young man, formerly an officer in Garibaldi's army, was struck by a dead ball over the right lid, from which he received a contusion of the eye. followed by hemorrhage of the retina. That eye had never recovered its functions and objects were seen confusedly. Since then the corresponding ear has become impaired, and has produced an almost complete deafness. The patient told me of two of his companions, wounded in like manner, one having a spent ball traverse the root of the nose, causing the loss of the right eye, and the other having a ball pass through the mouth, destroying the left eye. Both had been made deaf in the corresponding ear as the result of the ocular injury.

In 1888 Rampoldi (to resume the observations collected by

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*An exceedingly interesting corroboration of an ear reflex having an inflammation of the eye as its basis occurred under the observation of the translator while this translation was being made. A woman of 40, a dressmaker, of an exceedingly nervous disposition, had developed very suddenly a sensation as if a foreign body were in the eye with blepharospasm and tremulousness of the lid occurring every few seconds. Accompanying this tremulous motion, and beginning coincidently with it, was a sharp pain in the corresponding ear with a sensation of fullness and fluttering in that ear. This had continued for two days. A superficial crescentic corneal ulcer was found on the upper and nasal margin of the left eye. Under cocain this was touched lightly with the galvanic cautery and argyrol 25% instilled, and a pressure bandage applied. The next day the photophobia had almost wholly disappeared and with the relief of the eye symptoms those of the ear had altogether passed away.

Laurens) reports the case of a patient in whom was a marked diminution of visual acuity in the right eye. There was present atrophy of the papilla with excavation. The visual field was contracted. The visual acuity was such as to enable the patient to read de Wecker No. 3 with the aid of a + 4 D. Sph. at a distance of 30 centimeters. Distant vision was slightly improved by a convex lens of .75 D. Tension increased. Right hearing markedly diminished. After iridectomy sight improved considerably and hearing was decidedly improved according to the statements of the patient and his friends. In order to hear it was no longer necessary to put his hand to his auricle the better to gather the sound waves.

Finally, Wolf has observed subjective auditory sensations in a case of acute glaucoma (after Rohrer).

These observations, widely different as they are from those that I have reported, are equally different from one another.

What interpretation can then be given to them from a pathogenic standpoint?

In the three cases of de Capdeville there is noted a similarity in the reactions that have been observed on the part of the ear, and the sympathetic irritation which in the eye preceded the sympathetic ophthalmia properly so-called. On the one side photophobia, diminution of visual acuity, photopsies; on the other, auditory hyperesthesia, diminution of hearing, tinnitus and vertigo. The coexistence of the two phenomena in the same patient, their rapid amelioration by the only rational treatment, enucleation, forces one to believe them to be symptoms of the same character. Whichever may be the nerves of the ear that give rise to the reflex irritation, whatever affects the sensorial nerves, sentient or vasomotor, the point of origin is in an irritation of the ciliary nerves. It is the trifacial which serves as the path for transmission of the reflex.

Much less clear is the relation between the visual and auditory difficulties in the observations of Dransart, in that, to say the least, the condition of the ear is often indicated in a most summary fashion, and where the existence of a marked diathesis on the part of the patients could in itself have produced the deafness. Dransart admits that the pathological relationships, through the intervention of the trifacial, are such that a wound of the eye could cause a deafness or relieve a deafness already present. "This action of the eye on the ear which appears capable of producing what we call reflex deafness and which can ameliorate a deafness when it exists, seems to occur by preference in certain pathologic states such as syphilis, alcoholism, the status lymphaticus, and scrofula" (Dransart.)

The interest attaching to these observations comes from the improvement to the hearing following iridectomy, an improvement—be it from the return more or less complete of the vision—or be it from the antiphlogistic action of the iridectomy and the suppression of the teasing which affects the iris when synechia be present. In the latter case the effect of an iridectomy would be analogous to the enucleation in the observations of Capdeville, and the cases are comparable. In either case it is a ciliary trouble which causes the auditory disturbance.

In the first two cases in which the deafness immediately supervened after an ocular traumatism, the cause would seem to be somewhat different. The deafness supervening in the conditions present in the alcoholic appeared to be more of the nature of a hystero-traumatism. It was a nervous deafness. In the child of nine years having hereditary syphilis and becoming deaf in one ear after being struck in the corresponding eye with a snowball, the deafness would also appear to be of the nature of a nervous reflex if we could be sure of the state of the hearing before the accident in so young a child having such an heredity.

The last two cases of Dr. Dransart seem to indicate that it is not necessary to have a ciliary irritation, but that the repeated irritative attacks of conjunctivitis might exercise a disturbing influence on the ear. But the statements of such patients are extremely vague. Here also the reflexes would be conveyed through the medium of the trifacial.

II. Aural Reflexes having for their Origin a Muscular Contraction in the Region of the Eye or a Static Defect of the Eyes.

The second group of observations includes those cases where the aural symptoms (generally tinnitus) are caused by a contraction of the muscles in the region of the eye—the orbicularis—the orbital muscles and perhaps even the ciliary, or by a disparity in the muscular balance.

"In a general way," says Moos, "one may observe contractions of the stapedius with the contractions of the minor facial muscles." In Gottstein's case (*Archiv. für Ohrenheilk.*, Band XVI, p. 61) spasm of the stapedius was associated with blepharospasm. Each contraction of the lids was preceded by a rushing or roaring in both ears, and this sensation persisted until after the palpebral spasm had ceased. More recently Jacobson (*Bericht aus der Berliner universitäts Poliklinick*, *Archiv. für Ohrenheilk.*, Band XIX, p. 42) has published two cases in which the subjective noises had been produced by muscular contractions. One of the patients had tinkling in the ears on forced closure of the lids, and at the same time by means of the otoscope and the manometer definite retractions of the membranum tympani were observed, which led Jacobson to report the tinkling sound as due to a contraction of the tensor tympani muscle. Moos observed in a woman of 60 years tinkling in the left ear, which was produced every time the patient put a pair of eye glasses or spectacles on the nose, and disappeared when these were removed. The ears were found normal on examination, and Moos ascribed the noise in the ear to a synergic contraction of the stapedius muscle excited by contraction of the muscles of the eye at the moment in which the glasses were placed on the nose, and from which a variation in the negative pressure in the labyrinth was the result.

In the facial paralyses that sometimes result from slight injuries or acute inflammations of the tympanic cavity, correlations are observed with the eye, among the most typical of which is the case of Habermann. On each movement of the lids there was produced in the ear of the patient a dull sound which disappeared after tenotomy of the stapedius.

"My personal experience," says Stevens, "leads me to believe that reflex irritations originating in the eye and affecting the sensation or the nutrition of the ears, are quite frequent in occurrence, and, indeed, that they are much more common than would be supposed from the fact that so little attention, if any, has been bestowed upon them. My experience seems to show," he continues, "that a large number of functional nervous troubles which may be related to the sensation or to the nutrition, may be produced by unfavorable conditions of the accommodation of the eyes."

"The following is an example which shows the value of correction of the eyes in certain cases having disturbances of the ears. A lady of forty-two was tormented by subjective sounds, and her hearing was reduced one-half. The ears when examined gave no indications of disease. Inflations with Politzer's bag gave no relief, general tonics, electricity, bromides, a change of air, all failed to modify in any degree the tormenting noises which destroyed sleep, added to the general nervous irritability of the patient, and made her miserable. There was slight insufficiency of the external recti muscles, and there were pains in the temples and brows. After three months of fruitless attempts to relieve the patient by such measures as have been mentioned, a partial tenotomy of one of the internal recti muscles was made. In a very few days the roarings and hissings ceased, the hearing returned to the normal standard, and the lady was greatly improved in her general nervous condition. In this instance it is as certain as any thing in medicine that the relief not only followed, but was the legitimate result of, the greater freedom of the eyes, which up to the time of the slight operation had been kept constantly on the alert to maintain monocular vision."

"I will not detain the Section by citing further illustrations, although many could be adduced, to show that relief to hypermetropia, to myopia, and other unfavorable conditions of the eyes, has been largely, and in some instances wholly, instrumental in restoring the hearing."

"If I have with sufficient clearness suggested that ocular defects may be classed among the reflex causes of loss of hearing, I shall find it easy to impress upon those who hear me the importance of habitually examining the visual condition of ear patients, and of affording such relief to defective states of vision as the science of ophthalmology so richly affords."

The case of Boyer, cited by Laurens, resembles in certain particulars the preceding observation. It is that of a man of 50 who suffered from intense vertigo accompanied by noises in the head. Following scarletina, which occurred at the age of ten, the patient presented complete obliteration of the right tympanic cavity. Complete deafness on the right, diminished acuity of hearing on the left. Since then the patient has suffered from a constant ringing sound like the tinkling of a bell.

During his childhood he never looked upon a lighted lamp or at a public speaker without experiencing a sense of confusion, or without seeming to see a slight motion in surrounding objects which compelled him to turn away for the moment.

These symptoms increased in frequency as he grew older, and at 21 he began to have attacks of nocturnal vertigo which were manifested most commonly when he was lying on the right side. He had a sensation as if objects turned in his head, and he was obliged to change his position. He could never lean back in a chair without feeling as if he were going to tumble. At the age of 40 he had momentary attacks of congestion of the head with a sensation of intense whirling vertigo accompanied by nausea and vomiting. At 55 he was taken suddenly with an attack of intense vertigo accompanied by deafness, and an objective and subjective sensation of extreme weakness and trembling. The habitual ringing became a roaring like that of a railroad train or of a strong wind blowing through the trees. This attack lasted for three or four hours. Ten days later he had another attack lasting for six hours. These attacks increased in frequency and in intensity, and at the period at which the patient visited New York the attack lasted for a week.

The patient walked unsteadily, his face was pale and his countenance wore an anxious expression. He held his hand to his ear in order that he might hear more distinctly. In the right ear the watch was not heard on contact. H. D. 6/40. The tuning-fork was heard with difficulty through the air, but rather better by bone conduction. In the left, hearing acuity was equally reduced by air and bone conduction. Obliteration of the right tympanic cavity. Sclerosis of the left m. t. Visual acuity O. U. 20/30, with + 2.50 D sph. Ophthalmoscope discovered slight chorioidal macula in each eye. On each side was a nasal pterygium well developed with a general congestion of the ocular conjunctiva. An examination of the muscles developed an exophoria of 3° with abduction reduced to 1°; with a red glass placed before the eye, homonymous diplopia of from 3° to 6°.

The muscles were intensely rigid, permitting only slight excursions in all directions, especially upward. An examination repeated on three successive days resulted in the development of an esophoria of 5°. A tenotomy of the right internal rectus made on July 19th reduced the esophoria to zero, increased the abduction to 7°, and caused the disappearance of the diplopia. The result was startling. When the patient returned the next day the noises had ceased, the sense of confusion had disappeared, and on th 26th the patient was able to go out. The muscular condition has not changed since the operation.

During four years following the patient had no vertigo whatever or noises in the ear. The ringing continued but the hearing acuity increased to such a degree that with the left ear the watch was heard at a distance of fifteen inches.

In 1892 he revisited New York because of a slight attack of vertigo. There was found a slight esophoria which was corrected by a tenotomy of the left internal rectus. After having corrected the defects found on the first examination the patient was recalled home by the illness of his wife. He had been well until January of the present year, when he complained of giddiness when he was lying back in a barber's chair. It was found that there was parallelism of the visual lines, but that the power of the upward rotation of the eyes was extremely limited, while the downward rotation was excessive. This was corrected with immediate relief of all symptoms. The eyes have now acquired great freedom of action; there is orthophoria, the patient's face has, for the first time, assumed a perfectly comfortable expression, and no return of the vertigo is to be expected.*

For the first of these observations one must without doubt ascribe it to spasm of the stapedius which, being innervated by the facial, could readily be associated with spasm of the orbicularis. As for the tensor tympani, the contractions are often clonic and are frequently coincident with convulsive tic. They may occur with spasm of the tubular muscles, with retraction of the membranum tympani, or with contraction of the muscles of the stapedius. They coincide with the blepharospasm and in the symptoms are noted noises in the ears and vertigo. (Castex.)

Concerning the observation of Stevens and Boyer, it would appear that it is the stapedius which is involved. But the muscular insufficiencies and the ocular conditions making it necessary that certain muscles should always be alert in order to maintain binocular vision, appear to bring about a reflex irritation to the inner ear which responds with noises—deafness and vertigo. It is not to be wondered at that this should result, knowing the importance of the semicircular canals in relation to the movements of the eyes. The relief of the auditory symptoms, and more especially of the vertigo, by means of a tenotomy, invests the subject with great practical interest.

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*Boyer reports nine other cases of like character.

III. Reflexes having for their Point of Origin a Luminous Impression.

The third group of observations includes those cases in which the ear reacts to an impression of light.

D'Arsonval has observed in himself aural disturbances excited by the effect of an electric light on the eye. Having looked intently for several seconds at an arc light he became deaf for an hour afterward. He repeated the experiment with the same result, each time the same phenomenon followed, whether the light shone in one eye or in both. The deafness affected both ears even when the light was seen by but one eye. The effect was not always transitory—in one instance deafness persisted for seventeen days. The phenomenon was produced by an arc light of great brilliancy which was generated by a strong electric current. The ear disturbances were accompanied by headache and a sensation of heaviness in the head not infrequently experienced by electricians. (Laurens.) D'Arsonval thought that the phenomena of inhibition were due to the action of the ultra violet rays. Brown-Sequard was of the opinion that it was not the optic nerve but the trifacial that gave rise to these especial aural involvements. (Rohrer.)

It is exceptional, says Laurens, that a sensation carried through the optic nerve awakens an auditory response. While there exist certain undeniable instances of what has been called color-audition, that is to say, that certain subjects possess the faculty of perceiving a sensation of color when an aural impression is received, the inverse phenomena, that in which a sensation of sound is excited by a brilliant color, is much more infrequent. However, Bleuler and Kehmann have reported observations of a man in whom the flame of a candle burning quietly gave an impression of the letters W and V. If the flame did not oscillate it gave an impression of the vowel I. The fact is of interest if it is not pure fancy. It is merely cited. (Laurens.)

It is in this category, however, that I should be inclined to class the case which I have reported. Evidently the tinnitus supervening upon the conditions which I have indicated in a most acutely hyperesthetic person might be explained by a spasm of the tensor tympani. In fact, the excitation received through the retina reacts by way of the optic nerve, not alone through the nuclei of the motor oculi, to contract the pupil and to raise the globe (reflexes of defense), but also through other nuclei and more especially those of the facial, to bring about reflex contraction of the orbicularis, and by involuntary closure of the lids to protect the eye against injury. The tensor tympani also receives innervation from the facial, so that it may participate in the reflex defense that a too brilliantly luminous impression may make on the face. It must be noted, however, in the case under consideration, that the tinnitus seemed to correspond more with the luminous impression than with the contraction of the orbicularis. Indeed, I have observed on several occasions that the noises ceased immediately on the closure of the eyes, and at the instant that the spasm of the orbicularis was most marked the roaring in the ears ceased. Any one may observe that on passing from the dark into the glare of a dazzling light, that the spasm of the orbicularis which follows persists for an appreciable length of time. Why then did the ringing in the ears cease on the spasmodic closure of the lids if the tinnitus was the result of a synergic spasm of the tensor tympani?

In 1881 Bleuler and Lehmann (*Zwangsmässige, Lichtempfindungen durch Schall.* Leipzig, 1881) made extended researches on the sensations having a reflex origin existing between the eye and the ear, and Urbantschitsch (*Pfluger's Archiv.*, Band XLII, p. 154) made similar studies. Bleuler and Lehmann established the fact that secondary sensations are more commonly excited in the visual centers through the perception of sounds than vice versa. He called the former sonorous photopsias, and the latter luminous phonopsias. Urbantschitsch regarded these phenomena as purely physiological, while Bluler and Lehmann considered them as approaching the pathologic if not actually of that character. They are in fact hereditary, the persons in whom they are most commonly observed being usually the victims in a greater or lesser degree of psychic disturbances; the young are the more predisposed.

The phonopsias having the eye as the point of origin are usually of the character of noises in the ear. Bleuler and Lehmann distinguished those of a harsh character (consonant) and those of a more musical tone (vowel), the noisy depending on the form and the movement, the musical on the color, the intensity of the phenomenon depending on the clearness of the object seen.

One does not know how to account for these phenomena, but they might be explained by an unusual excitation which was not limited to a single sensorial field, but which extended over into a second. There are to be found analogies in the pathologic reflexes.

There are very many persons whose impressionability to colors is increased if at the same time they listen to the sound of a tuning fork, and reciprocally on subjecting the eye to the action of light either ordinary or colored, the noises in the ears are increased or weakened, subjective musical sounds are lowered or raised, the acoustic field modified, and the subjective sounds diminished as if their place of origin had been changed. (Ostmann and Urbantschitsch.)

Speaking of color-audition, Gelle (*L'audition et ses organes*, p. 320) explains it thus:

"The energy of the sound waves which strike the organ of hearing may give rise to divers subjective sensations, as algias, spasms or simple reflex esthesias, or by diffusion of the energy to the neighboring sensorial foci by way of the cerebral association fibers.

"The external phenomena do not affect a single mode of sensation exclusively. It is our attention that fixes the choice. There is always, however, a place for the unconscious perception which is nevertheless impressionable.

"We have often observed how fixed attention—and apprehension is one of its exaggerated forms—puts the nerve centers in a condition of hyperexcitability: not alone those of audition, but of all the senses combine their efforts in an attempt at an understanding or perception, or analysis, or discernment of external phenomena. This superexcitability explains the radiations of nervous energy to the adjacent focal centers, and the multiplicity of points affected by the one sensation of sound, and more especially in the nervous and those particularly predisposed.

"In this condition of hyperesthesia of the senses, a visual impression of one kind or another may immediately succeed a perception of sound. It is this that we term color-audition. They are the simple flashes of light (phantasma) that appear following a sound or noise and are more marked in the dark. The simplest and most common of these phenomena are the flashes of white light which pass before the eye when a sudden and violent noise shocks the ears. There is almost always added to this—certainly in my own case—a contraction of the orbicularis as from surprise or fear. These three phenomena are concurrent. The reaction of the motor element need not excite surprise, it is a single reflex gesture of defense.

"A theory of color hearing is yet to be formulated. We have, however, in this article pointed out the complexity of a sensation to which all of the senses contribute, one, however, remaïning superior. The erethism resulting from fixed attention makes it more easy to understand the abnormal associated sensations when we know that they may exist physiologically. It is the pseudoesthesias, the phonopsias, and photopsias of unusual intensity which make us conscious of the phenomena and bring them in evidence. This is, I believe, the opinion of Urbantschitsch.

"Some have believed that these manifestations were individual idiosyncrasies."

I have reproduced this entire passage not alone because the considerations apply to my own case, but by a simple transtransposition of terms they explain completely the observation which I have reported.

In brief it is admitted that color-hearing is not a peculiar phenomenon, but is one of a group of phenomena which include all of the organs of special sense, and are involved in the fact that two different senses may be actuated simultaneously by an impression received by but one. Not only is the possibility not denied that an auditory sensation may immediately succeed a luminous one, but all authors admit *a priori* in accepting the fact that in some way the eye is not infrequently influenced by the ear and vice versa. But Ostmann has shown that if the attention of ophthalmologists has been attracted in such a slight degree to facts of such great importance both from a physiologic and from a pathologic point of view, it is owing to the extreme rarity of the communications which have appeared bearing upon the subject.

After Féré, cited by Laurens, these phenomena are explained by the equivalence of the physiologic effects to the sensorial excitant, and that which makes this interpretation possible is that the subjects of these visual phenomena in relation to auditory excitants are able to absolutely determine the effect on the ears from corresponding effect on the eyes. (Cases of Rochas, Bleuler, Lehmann.)

As to the mechanism it will be necessary, as in color-hearing, to search in one of the two following directions, (1) in the physical mechanism, (2) in the physiologic mechanism, by means of the association fibers which, passing through the cerebral cortex, unite the different psycho-sensorial centers, and which are called upon to explain the psychic representation of an object by means of the different sensorial qualities that are produced in the several organs of special sense. (Laurens.) On this subject Urbantschitsch remarks that the sensations which are habitual are often influenced (at least in their corporeal interpretation) by other coexisting sensations which are also carried on through their usual channels.

The case of d'Arsonval and the observation which I have reported at the beginning of this paper each having an analogous point of origin (an intense luminous impression) are quite different in their effects. While in my own case there was an auditory excitation, in that of d'Arsonval, on the other hand, was that of inhibition—that of deafness. The deafness here resembles that which had been produced by a lesion of the eye. In fact, when a dazzling light strikes the retina the result is an actual traumatism on so delicate a tissue. If such an intense glare is continued too long it is possible to have congestion, inflammation, or hemorrhages, all of these conditions being demonstrable by the ophthalmoscope, and producing scotomas of greater or less amplitude in the visual field and having a greater or less permanence. The deafness will then be of like character with the traumatism of the retina and chorioid, and it will be the ciliary and through these the trifacial which serve as the pathway of the reflex. The duration of the deafness will correspond with the duration of the retinal lesions. It would be most interesting if we could study at the same time the eye and the ear of patients affected in this way. In the case of d'Arsonval, the fact that the deafness was bilateral even when but one eye was exposed to the intense light serves to demonstrate how general was the brain involvement in the production of the phenomenon.

In the case which I observed and in which a sensation of sound accompanied the sensation of light I can readily believe from a comparison of phenomena well known and admitted, of color vision, that in a patient anemic and hyperesthetic, a strong retinal excitant could at the same time awaken in the cerebral centers a sensation of sound as well as of light.

CONCLUSIONS.

There exist then between the organs of vision and of hearing relations at once direct and varied, relations which the nervous connections, whether central or peripheric, serve fully to explain. It must first be admitted, however, that as objects are perceived through the medium of both organs, the excitation of the one can awaken through the agency of association fibers images of the memory belonging to the other.

In so far as the influence of the eye on the ear is concerned, the relations are such that a lesion of whatsoever character (cornea, iris, retina, conjunctiva, etc.), a static trouble of the eye itself, disturbance of the accommodation, or a simple lowering in the visual acuity can produce a reflex deafness (phenomena of inhibition) or of reflex irritation manifesting itself by vertigo and noises in the head, with or without deafness.

Among these relations we must consider the phenomena of aural irritation as quite comparable to the irritation which develops in the fellow eye preceding a sympathetic ophthalmia.

In connection with these phenomena it would appear evident that a contraction of the stapedius can be produced synergically with a contraction of the orbicularis giving rise to noises in the ear.

Finally, it must be admitted that a luminous impression occurring under certain conditions may awaken in the higher brain centers phenomena of a character analogous to color-audition.

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SIZE VERSUS DISTANCE IN TEST TYPES.

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It seems to be generally assumed, even by men holding positions which ought to enable them to know better, that Snellen's Optotypi have been officially and formally recognized and adopted as the standard test for the vision by Ophthalmological Societies and also Governments all over the world. This, however, has never and nowhere been done and there is no prospect that it will ever be done. The only official action of this kind ever taken was when, in May, 1905, the American Ophthalmological Society adopted as standard certain features of Snellen's Optotypi, especially the visual angle of five minutes subtended by the letters, or of one minute subtended by each of their component lines, while in regard to other features, especially the gradation of the distances in which the letters are subtending, preference was given to some alterations which Dr. John Green of St. Louis suggested in the sixties of the last century. Such action, however, places nobody under obligation, especially not non-members of that society.

Nevertheless, Snellen's Optotypi deserve, in a way, the attribute "standard." Webster and other authorities distinguish between two kinds of standard, namely: that which is established as a rule or model by authority, especially legal authority, and that which is established by custom or general consent. In the latter sense Snellen's Optotypi are standard, and in spite of the decision of the American Ophthalmological Society they are recognized as standard and used unchanged not only by private parties, especially Beneficiary Associations, which adjudge with them their compensations for injuries to the eyes, but also by Government Officials. The American Bureau of Pensions, for example, directs each board of examiners to supply itself with a card of Snellen's Test Types.

In the same spirit in which the American Ophthalmological

Society acted, so also a distinction is made by others between the visual angle and the distances in which the letters subtend it. Snellen's visual angle of five minutes is retained by all with a reverence which could not even be shaken by Snellen's own words when, in 1874, in the Graefe-Saemisch Handbuch der Augenheilkunde, he said: "The visual angle of five minutes is *arbitrarily* assumed. It does not represent the average acuity, and by no means the maximum of the vision."

The distances, however, in which the letters subtend the visual angle, and the resulting sizes of the letters are figured differently by authors of test types. The American Ophthalmological Society was outspoken, when it adopted Green's way of grading in preference to that of Snellen. Concerning both I refer to the second volume of Norris and Oliver's System of Diseases of the Eye, in which, in 1897, Snellen, 23 years after the publication of his article in the Graefe-Saemisch Handbuch, treated the same subject.

The author of the Instructions to Examining Surgeons of the Bureau of Pensions is not so outspoken. The Bureau wants to know the claimants' vision after correction of any anomaly of the refraction present, and therefore it directs its examiners to supply themselves with a chart of Snellen's Test Types. The directions, however, which it gives for its use, cannot be applied to it. It says the Snellen chart should be hung at a distance of 20 feet from the claimant in good light; and continues, "The largest type on the card is numbered 200, while the smallest is generally 20 or 15. Record the smallest type that can be read and make it the denominator of a fraction, while the distance, or 20 feet, will be made the numerator. Thus: If the claimant can read only the type numbered 50, record the vision as $\frac{20}{50}$ etc. For the sake of uniformity, use only the foot as the unit of measurement for recording vision."

This description does not answer Snellen's Optotypi. He published these first in Paris feet and later in metres, but never in American feet. Test types have been published in this country under the name of "Snellen charts" which answer the description given by the Bureau of Pensions; their authors, however, had no right to use Snellen's name, and it is time to protest against these imitations.

Snellen wanted his chart to contain just seven rows of letters of such sizes that they subtend an angle of five minutes in distances ranging from 60 to 6, respectively 50 to 5, metres, and gradated them from the largest down to the smallest in an arbitrary irregular manner. After having determined the smallest letters which the patient can see at a distance of 6, respectively 5, metres, he makes him move from the chart to see whether he can still recognize these letters at a greater distance. The changing of the distance between patient and chart is an essential feature of Snellen's Optotypi. The Bureau of Pensions does not direct its examiners to change that distance, and it directs them to use a chart based on a principle entirely different from that of Snellen's; consequently the Bureau of Pensions does not use Snellen's Optotypi at all. As far as I can judge, they are very little, if at all, used or even known in this country;* Snellen's name is, however, wrongfully used by various authors of test types.

The gradation of the distances has been altered by Green and his alteration has been endorsed by the American Ophthalmological Society. Snellen and Green, though differing in the principle of the gradation, have two features in common: Both retain the visual angle of five minutes, and both commence their gradation at the greatest distances.

It is to be regretted that neither Snellen nor Green published on their charts the sizes of their letters; they confined themselves to stating the distances in which they subtend the visual angle of five minutes. In private correspondence Dr. Green informed me that the first edition of Snellen's Optotypi was accompanied by a pamphlet containing the sizes, but from the second edition on this was omitted; and that he and Snellen, both used the tangent of five minutes in figuring the sizes.

In 1895 two charts were published with pamphlets in which the authors stated the manner in which they figured their sizes, namely: B. Alex. Randall of Philadelphia, who did it with twice the tangent of 2½ minutes, and Leopold Weiss of Heidelberg, Germany, who figured with the tangent of five minutes. In 1897 also, Snellen said in Norris and Oliver's System that he figured with the tangent of five minutes.

Figure 1 shows how an angle can be subtended and the subtending lines figured. It shows a number of concentric arcs and a sector lined by two radii and divided by a third radius into two equal parts. The third radius represents the visual axis, and the angle the visual angle which is at the first arc subtended by the chord and at the second by the chord and a tangent. The chord represents twice the size of half the angle and the tangent of the second arc represents twice the tangent of half the angle. There is, however, also a tangent of the whole angle which is added from the third arc, or so that there are four lines, namely: the chord, the arc, twice the tangent of half the angle, and the tangent of the whole angle.

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* Some time ago I ordered Snellen's Optotypi from a large book emporium in Boston, but they could not find a copy of it in this country and had to send for it abroad.

When, many years ago, I first heard of test types being figured by lines *subtending* the visual angle, I took it for granted that this meant the chords; nobody, however, seems to have figured with them. Snellen, Green, Weiss, and Randall figured as above stated, and quite recently the well-known optical firm, F. A. Hardy & Co., published with the endorsement of Dr. Nelson M. Black, a chart of test types which are figured with the arc. It claims to be an absolutely correct Snellen chart, which, however, it is not. The visual angle and the subdivision by five excepted, it has none of the characteristic features of Snellen's Optotypi. As this chart is intended especially for Railroad Service, I wish to say that its requirements are too low. Nobody should be employed as engineer or fireman who cannot read at 20 feet much smaller letters than even Hardy's 15 feet letters. Snellen himself realized that the smallest letters of his two charts were too large, and added later a third, with letters subtending the visual angle at 5, 4, 3, 2, and 1 metres.

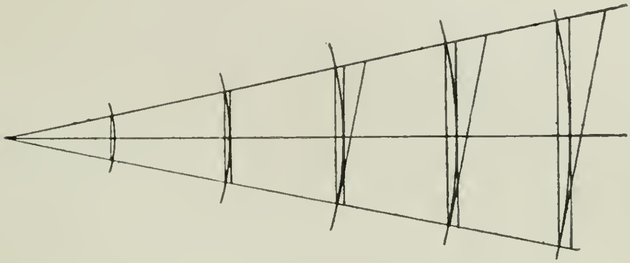

FIG. 1.

In Figure 1 I had, of course, to select a large angle for the demonstration of those different lines. For so small an angle as five minutes the differences between chord, arc, etc., are so small that some authors consider them as negligible. Still, in the large letters they become noticeable. Randall figured the size of the 60 metres letters with twice the tangent of 2½ minutes, as 85.5 millimetres, and with the tangent of 5 minutes as 87.24 millimetres.

From the use of different trigonometric equivalents by different authors of test types; from differences in the gradation of the distances; from differences in the lineal measures of different countries; and last but not least, from inaccurate reproduction of the same chart by different publishers in consequence of the failure of the authors to state the exact sizes of the letters, there is to-day quite a confusion in test types.

No matter which trigonometric equivalent of the angle of five minutes be used, the result is always a very complicated fraction, and one which is hard to divide by 5; less so in the metric system than in the lineal measure of this country. The chord of the angle of five minutes has at a distance of 20 feet a length of $\frac{5.58336}{16}$ in.

In 1874, Green established a very important precedent by making a distinction between the exact and the approximate distances at which the letters subtend the visual angle. He commenced with the arbitrarily assumed distance of 200 feet, which he later changed to 242, and gradated the other distances in a descending geometrical progression with the formula $\sqrt[3]{0.5} = 0.795$. The origin of this formula is unknown to me; its meaning is that always the next following distance measures "about" 80 per cent. of—or is "approximately" 20 per cent. shorter than—the next preceding. In the same spirit I said $\frac{5.58336}{16}$ in. is the exact, and $\frac{5}{16}$ in. is the approximate length of the chord of the visual angle at 20 feet from its point.

The fraction $\frac{5}{16}$ is an eminently practical number for the gradation of test types drawn in Snellen's style, that is, square letters with lines measuring one-fifth of the size of the whole letter. The value $\frac{5}{16}$ can easily be raised or lowered by multiplication of the numerator or the denominator, respectively.

By placing $\frac{5}{16}$ into apposition to $V_D^d = 1 = \frac{20}{20}$ the starting point is obtained for an absolutely exact and easily controllable scale of vision and corresponding test types; a scale which is "*standard,*" because it is based on the legally standard lineal measure of this country. Any one who possesses a draughtman's ruler can make for himself such a chart of test types. Any one can make squares of $\frac{5}{16}$ in. side and draw letters into them the component lines of which are $\frac{1}{16}$ in. thick. To these some larger and also a few smaller ones are added in arithmetical progression; the numerator of the fractions which indicate the sizes must, however, always be divisible by 5. If the size-fractions are expressed in sixty-fourths, their numerators tally with the denominators of the corresponding vision-fractions, as follows:

Vision,	$\frac{20}{10}$	Size,	$\frac{10}{64}$	in.	($\frac{5}{32}$)
"	$\frac{20}{15}$	"	$\frac{15}{64}$	"	
"	$\frac{20}{20}$	"	$\frac{20}{64}$	"	($\frac{5}{16}$)
"	$\frac{20}{25}$	"	$\frac{25}{64}$	"	
"	$\frac{20}{30}$	"	$\frac{30}{64}$	"	($\frac{15}{32}$)
"	$\frac{20}{40}$	"	$\frac{40}{64}$	"	($\frac{5}{8}$)
		etc. until			
"	$\frac{20}{200}$	"	$\frac{200}{64}$	"	($3\frac{1}{8}$)

If you figure, as Snellen did, with the tangent of the whole visual angle, you obtain at the distance of 200 feet $3\frac{6.72}{16}$ in. If you call this $3\frac{7}{16}$, you obtain a value which is $\frac{11}{10}$ of $3\frac{1}{8}$ ($\frac{220}{64}$ against $\frac{200}{64}$). By reducing $\frac{5.5836}{16}$ to $\frac{5}{16}$ ($\frac{11}{32}$ to $\frac{10}{32}$) I cut off $\frac{1}{11}$ of its length and therefore my letters do not fully subtend the visual angle in their respective distances. I do not consider it necessary that they do, but, if you want to know the exact length of the subtending lines after Snellen in those distances, add 10 per cent. to my sizes and you will obtain his sizes as closely as they can be figured.

I devised my chart many years ago, when I recognized the confusion existing in test types from different authors, the impossibility of reproducing any of them myself, and the impracticability of Snellen's Optotypi for the quick collecting of large numbers of exact tests of the vision, especially of school children. I published it, however, only recently after having done all my work on the relation of the vision and refraction to the general health, parts of which were published in the ANNALS, with self-drawn test types.

CONCLUSIONS.

1. Snellen's Optotypi are based upon arbitrarily assumed and impracticable values. They are nowhere officially, but in many places, especially in the old country, by usage recognized as standard.

2. Green first introduced a regular gradation of the *distances* of the test types in descending geometrical progression. Neither he nor Snellen stated the *sizes* of the letters. Snellen used the metre and Green the American foot.

3. While Snellen's Optotypi are hardly used in this country, his name is improperly used for charts based on principles entirely different from his.

4. My proposition is to make the *sizes of the letters,* instead of the *distances,* the principal thing; to gradate the sizes commencing with $\frac{5}{16}$ in. in arithmetical progression descending as well as ascending; and to state the sizes and the corresponding vision on the chart.

HERPES ZOSTER OPHTHALMICUS WITH INVOLVEMENT OF THE CORNEA AND WITH OCULOMOTOR PARESIS.*

Burton Chance, M. D.,

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Herpes zoster ophthalmicus is not a rare disease. I have seen a few cases of it. But it never has been my lot to treat it either in private or public, nor have I seen such a case as the one that I am about to describe, which came under my observation in April, 1908.

On April 4th, a lady of advanced years was seized with a dull continuous pain in the left side of her face. On the 6th deep redness appeared, followed suddenly by an eruption of vesicles on the nose, the cheek and brow. The eyeball became tender and painful after several days. An annoying diplopia set in. Seventeen days after the first symptoms the lady sent for me because of the diplopia and the intensity of the pain in the globe. I found her face, nose and eyelids bloated, brownish and rather indurated. Over the surface were many vesicles in various stages of evolution. The vesicles appeared to have been erupted in crops, for some were crusted, while others were clear blebs. The most severe lesion was on the side of the nose. The lymph glands on the side of the face were not swollen. There was incomplete ptosis of the upper lid. On elevating the lid it was noticed that the eyeball was fixedly turned outwardly and downwards. The conjunctiva was injected and from it came a rather viscid discharge. The cornea was apparently whole, though it was somewhat edematous and insensitive. The iris was healthy; the pupil round, more dilated than its fellow, and sluggish in reaction. It was not possible to observe with certainty the state of the tension through the indurated lids.

The lady was so greatly excited, and she was so anxious lest a general paralysis was impending that it was impossible to make any tests for the measurement of the muscular reactions. The false image appeared to be projected obliquely. Fearing these symptoms might indicate the onset of glaucoma, I instilled a strong solution of eserin salicylate and prescribed a weaker solution for frequent daily use. A mercurial purge with salines was ordered, to be followed by calomel thrice daily. After two days there was a reduction of the cerebral fullness, and there was a gradual relieving of constitutional symptoms, which made me no longer fear glaucoma. The lady declared that the images were closer together than at my first visit.

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*Read before the Section on Ophthalmology, College of Physicians of Philadelphia, December 17, 1908.

It was now evident that the case was one of herpes zoster ophthalmicus. Believing that the cause of the zoster was gastrointestinal intoxication rather than rheumatism, or exposure, or trigeminal injury, I prescribed a saturated solution of salicylate of sodium to be taken thrice daily: ten drops, to be rapidly increased to twenty, in a tall glass of vichy water. In the meantime, the diet was to be restricted. In a week the lady came to my office. All the vesicles had dried; the induration had softened, but the tissues were brawny. There was some headache, but the ocular pains had become less, and in spite of the diplopia the eye was more comfortable. The left globe could not be rotated within the vertical meridian, nor above the horizontal. The phorometric measurements were so various and irregular as to be untrustworthy. The images appeared to separate widely when the eyes were rotated to the right.

On the sclera near the lower outer limbus a broad flattened vesicle was seen, and at the center of the cornea was a more or less superficial rounded area of infiltration. The cornea was moderately edematous. These vesicles were believed to be an extension of the herpetic process over the cornea. Because of acute indigestion and pain, the sodium salicylate was reduced to five drops thrice daily. In two days there was marked relief of all general as well as local symptoms. The corneal edema was reduced, the vesicle had not ruptured, and the infiltration had not extended nor become purulent. After five days the edema had disappeared, the vesicle had shrunk, and the infiltrate had begun to be absorbed. The ocular excursions had decidedly increased; the globe could be rotated above the horizontal and also slightly inwards.

The ocular movements had now begun to be singularly disordered. Heretofore no observation had been made upon the movements of the globes; there had never been any symptoms requiring their estimation. It was noticed now that the left eye moved upward much more rapidly than the right, and that it was possible to fix with it. But, singularly, the right eye was then seen to descend below the horizontal plane. At rest, the right appeared to be on a lower level. With the phorometer the measurement was doubtful, but it hovered about 10 degrees R. H.

Red iodide of mercury 1/25 grain in pill, was substituted for the sodium salt. During the whole time of my ministration simple lotions and light bandages were used, while all efforts were bent to counteract what I believed to be a general toxemia.

In two weeks the left globe was still injected and though the infiltrate remained, the cornea was clear enough to afford satisfactory ophthalmoscopic examination. There was still a slight elevation of the left eye with descent of the right. Three weeks later the diplopia and the muscular aberration had disappeared, and the eyes were statically balanced and could be rotated equally in all axes. For the first time since the attack began the lady was able to read without discomfort. Toward the end of June the pains left the face and eye, and the globe became sensitive again.

A recent letter requesting the lady to visit me for the purpose of a review of her case, brought a reply that "she had no case for review, as she has not been so well for years."

The points to be observed in this case are the involvement of the oculomotor branches and the rather late eruption of vesicles on the cornea. Oculomotor paresis was not present at the onset, but developed later and persisted for several weeks after the vesicles had become dry. As I believed the lady's system to have been in a state of mild toxemia it is conceivable that the cause of the ocular paresis was a disturbance in the nuclear regions. In this connection it is rather singular that the pupillary fibers were not affected. It must be remembered that I did not attend the lady in the first stages of her disease. It would have been interesting to note the mode of onset of the herpes. When I first saw her the eruption on the nose was the most severe. I, therefore, watched with expectancy the eruption on the globe.

235 South Thirteenth Street.

ATROPIN—ITS USE AND LIMITATIONS IN THE CORRECTION OF HETEROPHORIA.

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In July, 1898, I published my first observations on the use of atropin in the correction of heterophoria *(Journal of Eye, Ear, Nose and Throat,* Baltimore). At that time I stumbled upon the treatment in a case which misunderstood directions, using the atropin three weeks instead of three days. Since then I have refracted 2000 cases with this drug; of these, 300 showed more or less heterophoria; of these 300, 93 have been tabulated for this paper; in the remaining 207 cases, either the heterophoria was too slight or the record too imperfect to be of value for this paper. The 93 cases are not as comprehensive as I should like, being merely data from records taken at the time. I have grouped them for convenience under the following heads:

1. Those where the heterophoria has been cured.
2. Those where the heterophoria has been improved.
3. Those not responding to the treatment.

It will be noticed that in nearly all of these cases glasses were prescribed; in a few, however, there was heterophoria without refractive error. It has been the observation of the writer that where there is error of refraction,—hyperopia, myopia, astigmatism or presbyopia, correction by glasses must be made after the heterophoria has been cured by atropin.

To obtain orthophoria by the use of atropin, glasses must be used when indicated, or the muscles will lapse into their former condition of heterophoria. It will also be noticed that no prisms were used.

In some of the cases the same correction was found before and after the use of the atropin, proving conclusively that although the glasses were correct, it required the atropin rest treatment to relieve the asthenopia. I am well aware that there are those who claim that if the eyes are properly corrected with glasses without using a mydriatic that the asthenopia dependent upon heterophoria will disappear. These claims are at direct variance with my own experience.

Another value in the use of atropin in heterophoria, is to bring out the full defect. Many eyes which show two degrees without, reveal as high as thirteen degrees with a mydriatic. This is very important from a diagnostic standpoint and also emphasizes the folly of doing a tenotomy where the data are so uncertain.

In children the atropin treatment is almost always successful.

The cases in which it seems to have little or no effect are anemic nervous young females who suffer from dysmenorrhea. On the other hand, neurasthenics who suffer from headaches and insomnia where there is neither heterophoria nor much refractive error, can be relieved of these symptoms for six months or more by resting the eyes under atropin for a few days, with, of course, the two weeks' rest of eyes thereafter. It has often occurred to me what a valuable therapeutic agent atropin would be for the neurologist.

Of this extensive use of atropin, covering 2000 cases, I have had one case of a hysterical female who developed well defined hallucinations; this condition lasted two or three days, but gradually disappeared.

The method of administration is to put one drop in each eye three times daily, instructing the patient to keep the lid closed for five minutes thereafter, and to wear dark glasses during the time the drug is used, and one week thereafter.

In patients over 45 to 70 years of age, where I am convinced there is no objective evidence of glaucoma, I do not hesitate to use atropin in correcting for glasses, whether with or without heterophoria.

The cases in which a complete cure was obtained are as follows:

1. Mrs. F. E. M., referred March, 1908, for eye strain. The patient had normal vision each eye with three degrees of esophoria. Atropin was used seven days after which her eyes were tested and no heterophoria found. The following glasses were ordered: O. D. plus sphr. 1. combined with plus cyl. .50, ax. 90; O. S. plus sphr. 1.

2. Miss M. C., aged 21, referred April 30, 1908, had five degrees of shifting esophoria. Atropin was used for two

weeks or more. A test made May 4th, showed four degrees; May 6th, five degrees; May 8th, two degrees; May 10th, three degrees; May 14th, one degree. On June 1st eyes orthophoric. This patient was of the neurotic type, suffered severely with her eyes for years and had a habit of intently looking at each object. Her social demands were so exacting that she suffered continuously from headaches and had more or less insomnia. The following glasses were ordered: O. D. plus sphr. 1, combined with plus cyl. .50, ax. 90; O. S. plus sphr. 1. combined with plus cyl. 1.

3. Mrs. C. M. B., age 27, referred September, 1907. Vision 15/20 in both eyes with three degrees of esophoria. Atropin was continued for five days, after which the eyes were tested with and without atropin showing no esophoria. The following glasses were ordered: Plus sphr. 2.50 each eye.

4. Mrs. C. J. C., age 32, consulted me October, 1899. Patient had eight degrees of L. H. and nine degrees of exophoria. In childhood had internal squint and considerable pain in the eyes and forehead. Vision was 16/20 right and 16/200 left. Atropin was used from October 7th to 22nd, after which the muscles were tested and showed no hyperphoria, but the patient could hold the eye straight for a moment or two, then it would indicate about one degree of exophoria. The following glasses were ordered: O. D. plus sphr. .50; O. S. minus cyl. 1.50, ax. 180, when complete relief was obtained.

5. L. L. M., age 27, referred August, 1898, had three degrees of esophoria. Vision 16/20 and 16/30. Atropin was used eight days. Two weeks later the muscles were tested and showed no exophoria. Complete relief from headaches. The following glasses were ordered: O. D. plus cyl. .75, ax. 95; O. S., minus cyl. .37, ax. 5.

6. H. C. R., age 14, referred February 20, 1898, had between seven and eight degrees of esophoria. After five days' use of atropin, there was no improvement in the esophoria. It was continued for two weeks, however, and a test made one month after treatment showed no heterophoria. No glasses were ordered.

7. W. J. R., age 35, referred April, 1898, had three degrees of hyperphoria and five degrees of exophoria. Vision 16/16 in both eyes. Atropin was used for twenty days and the mus-

cles soon after were perfectly balanced. No glasses were prescribed as eyes were emmetropic.

8. Mrs. J. H. P., ag 50, consulted me March, 1898. Vision 16/20 in each eye, presbyopia. After four days' use of atropin the muscles were tested and found to be straight. The following glasses were ordered: O. D. plus sphr. 1.50; O. S. plus sphr. 1.50; and 2. D. added for reading.

9. Mrs. George B., age 28, referred October, 1900, had one degree R. H. and seven degrees shifting exophoria. Vision normal in each eye. Atropin was used and tests made during its use of six days. The second day showed six degrees; third day, four degrees; fifth day, one degree, and after the drops were out of the eyes, no heterophoria, and she had complete relief from headaches. No glasses were ordered.

10. Miss C., age 22, consulted me December, 1898. Vision 16/20 in each eye. Eight degrees of shifting exophoria, which was entirely corrected after atropin had been used six days, followed by a two weeks' rest. January 9th, 1899, no heterophoria.

11. Miss P., age 51, referred March, 1908. She complained of a tired feeling and headache over the right eye. Vision 6/148 and 8/148, with four degrees of exophoria. Atropin was ordered and continued from March 25th, to April 14th, after which tests were made as follows: April 11th, showed one and one-half degrees; April 13th, one-half degree of exophoria. The drops were discontinued and the following glasses prescribed: O. D. minus sphr. 9. combined with minus cyl. 3.50, ax. 30; O. S. minus sphr. 8. She now has no trouble with her eyes.

12. Mr. F. H. K., referred March 17, 1908. Normal vision in both eyes with one degree of exophoria and two degrees of L. H. A test made March 21st showed three degrees of L. H. and one and one-half degrees of exophoria; March 23rd, one-half degree of L. H. and no exophoria. March 24th, four degrees L. H.; March 26th, three degrees L. H.; March 28th, five; March 31st, two and one-half L. H.; April 2nd, the same; April 4th, one; April 7th, one-half degree of L. H. The drops were discontinued and two weeks after glasses were ordered as follows: O. D. plano; O. S. plus cyl. ax. 125 with plus sphr. 1. added both eyes for near work.

Mr. K. is at the head of a large commercial enterprise, and with great difficulty was persuaded to put his eyes out of commission; but he had arrived at a point where something had to be done, as it was impossible for him to continue using his eyes. Even while the drops were in, he was at his desk and did not give the absolute rest that was necessary. A month after wearing the glasses the patient called and said he had had only one or two attacks of headache, and was, on the whole, much improved. At the present writing he has worn the glasses about three months with comparative comfort.

13. H. J. B., age 21, referred September, 1899, complaining of headaches and pain after reading. Vision of right eye was 16/30 and in the left 16/20, with six degrees of exophoria. Atropin was used for correction, and plus sphr. 75, each eye prescribed after it had been used six days. A test made two weeks after showed no exophoria.

14. Mrs. J. O. A., age 25, referred June, 1902. Her vision was 15/30 in the right eye and 15/45 in the left eye, with nine degrees of esophoria. She complained of severe pain over the eyes. Atropin was ordered and used from June 17th until July 12th. The muscles were then tested and orthophoria found. The following glasses were ordered: O. D. minus cyl. .25, axis 60; O. S. sphr. .50 combined with minus cyl. .75, ax. 120.

15. H. W., age 17, referred May, 1899, complained of headaches. Vision of right eye was 8/200; left 8/70 with thirteen degrees of exophoria. Atropin was used eighteen days. A test made June 11th showed twelve degrees; June 15th, eight degrees. Other tests were made as follows: June 12th, showed four degrees; June 16th, one degree. The drops were then stopped and she had complete relief from headache. The following glasses were ordered: O. D. minus 3.50; O. S. minus 2.

16. Y. T., referred 1902. Vision was 15/20 and 15/25 with twenty-two degrees of exophoria. Perhaps the case was due to some lesion either peripheral or central. A careful examination was made to that end with negative results. Atropin was used, and after five tests the following glasses were ordered: O. D. plus sphr. .75, combined with plus cyl. ax. 90; O. S. plus sphr. .50, cyl. .50, ax. 90. The test made two days after the use of atropin showed twelve degrees of exophoria; three days after, eleven degrees; five days after, four degrees. On February 4th, one month from the time treatment was instituted, the muscles were orthophoric.

17. A. W., age 60, referred June, 1899. In this instance atropin was used only three days and the test made after the drops had disappeared, showed no exophoria. The following glasses were ordered: O. D. plus sphr. 2; O. S. plus sphr. 1. combined with cyl. .50, ax. 90.

18. Miss M., age 28 (teacher), referred June 10, 1907; had shifting esophoria from two to sixteen degrees. Atropin was ordered; a careful refraction made, and the following glasses ordered: O. D. plus cyl. .50, ax. 90; O. S. plus cyl. .50, ax. 90. Atropin was used eight days. Tests were made as follows: Second day showed six degrees; third day, sixteen degrees; fifth day, three degrees; eight day, one degree. On June 30th eyes were straight. This patient returned the next August complaining of a little irritation of the eyes which were tested, and I found that she had one degree of exophoria. This also was corrected.

19. Miss N., age 21, referred February, 1908. She complained of severe temporal pain; also pain in face, and had choreaic movements of the face. Three degrees of L. H. Atropin was used twenty-eight days, after which a test was made which showed the eyes to be orthophoric. So far patient has worn the glasses with comfort, which were as follows: O. S. minus sphr. 1.50 combined with minus cyl. 2.50; O. D. minus sphr. 2.75 combined with minus cyl. .75, ax. 15.

20. Mr. T. S., age 52, head of a large department of railroads, consulted me for severe eye strain. Vision 15/45 right, 15/65 left. Atropin was ordered and used for six days, after which a test was made and the following glasses ordered: O. D. plus sphr. 1.75, combined with plus cyl. .50, ax. 180 O. S. plus sphr. 1.75 combined with a plus .50 cyl., ax. 180 for distance and plus sphr. 2. added for reading. Two weeks later the eyes were tested and no heterophoria found. The patient returned June, 1908, five years after correction, and the muscles were again tested and found to be perfectly straight; nor did he complain of any further trouble with his eyes, he having called simply to have a broken lens repaired.

21. Nora R., age 15, referred December 5, 1900, had eight degrees of exophoria, and complained of constant headache over the eyes. Vision 4/200 in each eye. Atropin was used eight days. A test made the third day showed three degrees of exophoria; fifth day, showed four degrees; seventh day, one degree of exophoria, and two weeks after the drops had

been discontinued her eyes were straight. The following glasses were ordered; Minus sphr. 5. combined with a minus cyl. 2., ax. 170.

22. Mr. A. F. (lawyer), age 31, was referred April 6, 1902. Had three degrees of exophoria and complained of severe pain over the left eye; in good physical condition otherwise. Atropin was used for four days, at the end of which time there still remained one degree of exophoria. At the end of two weeks from the time the drops were stopped, the eyes were practically straight, although occasionally would shift to one degree of exophoria. This, however, was corrected later. The following glasses were ordered: O. D. plus cyl. .50, ax. 90; O. S. plus cyl. .75, ax. 75. This case reported in 1905 and 1906, and there had been no return of headache.

23. Mrs. T. J. D., age 30, consulted me August 18, 1898. Vision in right eye was 16/20, left 16/40. Case showed seven degrees of esophoria. The use of atropin for four days was sufficient to completely relieve the heterophoria. The following glasses were ordered: Both eyes plus sphr. 2.25 D.

24. Elizabeth J., age 10, consulted me October, 1901. Vision 15/65; 15/45; one degree of L. H., nine degrees of exophoria. Atropin was ordered and used, one drop in each eye three times daily for six days. At the end of the second day, the muscles were tested and showed seven degrees of exophoria with no hyperphoria; fourth day showed four and one-half degrees of exophoria; fifth day, three degrees of exophoria; sixth day one degree. Patient was ordered to stop the drops and return in two weeks, when the muscles were tested and found to be orthophoric. The following glasses were ordered: Both eyes, plus sphr. .50 combined with plus cyl. ax. 180.

25. W. Van B., age 13, referred to me August 15, 1900, complained of headache and congested eyes. Vision, negative; accommodation, negative; four degrees R. H., ten degrees exophoria. Atropin was used for one week. On the third day a test was made which showed two degrees of exophoria. Some headache continued until adenoids were removed, when relief was complete and permanent.

26. Miss E. A. C., age 12, referred to me November 9, 1901. Had eight degrees of esophoria. Vision when examined was 15/30; 15/20. Atropin was used for four days, and two

weeks after the drops were stopped, a test was made, which showed no esophoria. The following glasses were ordered: O. D. plus sphr. 2. combined with 1.25 cyl. ax. 80; O. S. plus sphr. 2. combined with 1. cyl. ax. 110.

27. Miss C., age 24, referred August, 1905, had two degrees of exophoria. The following glasses were ordered: O. D. minus sphr. 2.75, combined with minus cyl. ax. 180; O. S. minus sphr. 2.75 combined with minus cyl. .67, ax. 180.

28. Mr. S., age 23, who consulted me 1907, had five degrees of esophoria. Atropin was used from January 16th to February 1st, at the end of which time his eyes were examined and showed no esophoria. The following glasses were ordered: O. D. plus sphr. 1. combined with plus cyl. .62, ax. 80; O. S. minus sphr. 1. combined with plus cyl. .62, ax. 100.

29. Miss P., age 18, referred April, 1904. Had eleven degrees of exophoria; two degrees of L. H. Atropin was used for three weeks and allowed to remain in the eyes for two weeks after. A test made at that time showed no exophoria. The following glasses were ordered: O. D. plus sphr. 2.50; O. S. plus sphr. 2.50.

30. Mr. P. J. M., age 42, consulted me October, 1904. Had two degrees of L. H. Atropin was used eight days, after which a test was made and showed no hyperphoria. The following glasses were ordered: Minus sphr. 10. for reading; minus sphr. 13. for distance in each eye.

31. Mrs. P. J., consulted me June, 1907. Had two degrees of exophoria and complained of severe headache. Atropin was used for six days at the end of which time the muscles were tested and showed no exophoria. The following glasses were ordered: Plus sphr. .50 in each eye.

32. Miss G., age 39, consulted me March, 1905. Had two degrees of esophoria. Atropin was used ten days and a test made two weeks after showed no esophoria. The following glasses were ordered: O. D. plus cyl. .75, ax. 125; O. S. plus cyl. .75, ax. 90.

33. Mr. G., aged 19, consulted me May 4, 1903. Had one degrees of exophoria and two degrees of R. H. Atropin was used and treatment continued for twenty-three days. A test made the second day after treatment showed six degrees of exophoria; fifth day, showed two degrees of R. H., and two degrees of esophoria; sixteenth day showed no hyperphoria. The following glasses were ordered: Plus sphr. .75 each eye.

A peculiarity about these cases is that they will go for several days with no improvement, apparently getting worse, and will then suddenly change for the better and go on to complete recovery.

34. Mr. A. C. S., age 29, consulted me June, 1904. Had two and one-half degrees of exophoria. Atropin was used for six days. a test being made every other day. When the drops had disappeared from the eyes there was no exophoria. No glasses were ordered.

35. Mr. W. H. C., age 37, consulted me September, 1904. He complained of headache and had four degrees of esophoria. Atropin was used eight days and a test made the twenty-sixth day after treatment showed no esophoria. He was entirely cured of headache. The following glasses were ordered: Plus sphr. 3.50 both eyes.

36. Mr. C. M. B., age 29, consulted me July, 1907. Had two degrees of exophoria. Atropin was used six days. He was then given a rest of two weeks and a test made at the end of this time found the eyes to be perfectly straight. The following glasses were ordered; Plus cyl. 1.50 both eyes.

37. Mr. R., age 19, consulted me May, 1907. Had two degrees of exophoria. Atropin was used eight days, after which a test was made which showed no esophoria. No glasses were ordered. He has had complete relief for the past year.

38. Mrs. M. L., age 38, consulted me March, 1905. Had two degrees of esophoria. Atropin was ordered and continued ten days. After a rest of two weeks, a test was made which showed no esophoria.

39. Mr. R. B. L., age 40, consulted me Decemberr, 1905, with three degrees of esophoria. He complained of persistent headache and insomnia. First day under atropin showed eight degrees of esophoria. It was continued for three weeks and tests made on the seventh and thirteenth day. Test made the seventh day showed three and one-half degrees of esophoria; thirteenth day showed two degrees; on the twenty-first day his eyes were perfectly straight. The following glasses were ordered: O. D. plus sph. 2.; O. S. plus sphr. 2. combined with plus cyl. ax. 140.

It was quite a problem to get this busy lawyer to give up his practice for so long a time, but after much perseverance he was persuaded to devote most of his time to hunting and fishing. The result in this case is marvelous, as he has had complete relief. This relief has continued up to date, which is now three years.

40. Miss Alice K., age 16, consulted me November, 1903. Had eight degrees of exophoria and one degree of R. H. Atropin was used, one week after which she was given a rest of two weeks. A test made at the end of that time showed her eyes to be orthophoric.

41. Mr. W. D. K., age 50, referred to me March, 1903, had twelve degrees of esophoria and five degrees of R. H. Patient suffered from very poor health; spent his winters in the South and was unable to work. His eyes were congested; had headaches; constant pain, and was unable to walk more than a block or two without severe fatigue. Atropin was ordered and continued from March 31st until May 2nd. The first test made after its use showed two degrees of R. H. and two degrees of esophoria; second test showed two degrees of esophoria and four degrees of R. H.; third test showed three and one-half R. H. and two degrees of esophoria; fourth test showed one degree of esophoria and one of R. H. A final test was then made which showed the muscles to be entirely straight. The following glasses were ordered: Plus cyl. 2. ax. 90 both eyes for distance; plus sphr. 2. added for reading.

It will be observed that this man was well advanced in years, and yet atropin was used with very excellent results. On April 15, 1907, four years after, he came in the office wearing the same glasses. A test was made and muscles found to be straight. This is a remarkable exhibition of the value of this drug.

42. Miss G. S., age 21, referred to me December, 1899. Had ten degrees of exophoria. Atropin was used eight days. The first day showed ten degrees; second, nine degrees; third, six degrees; fourth, five degrees; fifth, four degrees. At the end of two weeks the eyes were perfectly straight, and have remained so up to the present writing. She is at present enjoying perfect halth.

In the following cases a permanent cure was not effected:

1. Ruth S., age 8 years, was referred April, 1907. Vision normal each eye, with fourteen degrees of exophoria. Atropin was ordered May 1st, and continued until May 15th. After using the drops three days the eyes were tested and showed nine degrees of exophoria. On May 5th the test showed five

degrees; May 9th, two degrees. On May 24th, after ten days had been allowed for the drops to get out of the eyes, a test still showed one degree of exophoria. No glasses were ordered.

2. Miss D., age 22, consulted me January, 1907. She complained of severe headaches, and had six degrees of exophoria. After atropin had been used for one week, she was given a rest of two weeks. A test was then made which showed one degree of exophoria. A second test was made a few days later which showed no exophoria. The following glasses were ordered: O. D. plus sphr. 1. combined with plus cyl. .37, ax. 75; O. S. plus sphr. 1. combined with .37 cyl. ax. 105. This was not permanent and a test showed one degree of exophoria.

3. Mrs. H. W., consulted me May, 1906. Had three degrees of exophoria. She complained of severe pain in eyes and more or less headache. The first test made under atropin showed eight degrees of exophoria; next test, six degrees; next, three and one-half; next, one and one-half. The final test showed scarcely one-half degree. She has, however, had much relief. The following glasses were ordered: O. D. minus cyl. .25, ax. 90; O. S. minus cyl. .62, ax. 90.

4. Miss E. C., age 20, consulted me May, 1903. Had three degrees of esophoria. Atropin was used twelve days. The greatest defect after the use of atropin was nine degrees, which was five days after its use. Three tests were later made which showed three, two and one degrees of esophoria. At the expiration of two weeks' rest, the following glasses were ordered: O. D. plus sphr. 1., plus cyl. 1., ax. 100; O. S. 1., ax. 60.

5. Mrs. D., age 25, consulted me February, 1907. Had three degrees of esophoria. She complained of headache occasionally, and more or less eye strain. The use of atropin was continued, but complete recovery was not effected after ten days' use. The following glasses were ordered: O. D. plus sphr. 2.50 combined with plus cyl. 1., ax. 90; O. S. plus sphr. 2.50 combined with plus cyl. .50, ax. 35.

6. Mrs. A. McC., age 31, consulted me April, 1907. Had six degrees of esophoria. Atropin was used six days and the following glasses ordered: O. D. plus sphr. 2.50 combined with plus cyl. 3, ax. 90; O. S. plus sphr. 1. combined with plus cyl. 3.25, ax. 85. Three tests were made under atropin.

The first showed four degrees; second two; third, one. This case has had complete relief although there is still a slight amount of esophoria.

7. Miss R., age 16, referred December, 1904. Had two degrees of esophoria. Atropin was ordered and continued for upwards of a week. The complete defect under atropin was six degrees. The last test made showed one degree of esophoria. No record was made of glasses.

8. Miss C. C. S., referred July, 1904. Had eight degrees of esophoria and six degrees of R. H. Atropin was used twelve days, after which an examination was made which showed two degrees of R. H. and sphr. 1. combined with plus cyl. .50, ax. 90.

9. Mr. N. B. R., age 21, referred March, 1906, had two degrees of esophoria. This defect was increased to eight degrees under atropin. Atropin was used for six days, and a test made two weeks after showed one and one-half degrees of esophoria. The following glasses were ordered: Plus sphr. .75, both eyes.

10. Miss E. B.,, age 24, referred February, 1908, had four degrees of esophoria under atropin. After using the drops for six days, tests were made which showed less than two degrees of esophoria. No glasses were ordered.

11. Mr. J. H., age 19, referred January 1904, had three degrees of esophoria under atropin. Atropin was continued for four days, after tests were made which showed one-half degree of esophoria. The following glasses were ordered: Plus sphr. 4. combined with plus cyl. 1., ax. 90 both eyes.

12. Mrs. M. W., referred February, 1903. Had five degrees of exophoria. Atropin was used six days. A test made the second day showed three degrees of exophoria; sixth day showed one degree. Two weeks after the test showed less than one-half degree. The following glasses were ordered: O. D. plus cyl. .75, ax. 80; O. S. plus cyl. .75, ax. 90.

13. Mr. H. F. S., age 19, referred July, 1902, had eleven degrees of exophoria and twenty degrees of R H. Atropin was used twelve days, when a test was made which showed five degrees of exophoria and five degrees of R. H. The following glasses were ordered: O. D. plus cyl. .87, ax. 90; O. S. plus cyl. 1, ax. 75

14. Miss M., age 17, referred December, 1900. Had eight degrees of L. H., and eleven degrees of exophoria. After

atropin had been used two days, the complete defect was seventeen degrees of esophoria and the hyperphoria was unchanged. The fourth day showed four degrees of hyperphoria and ten degrees esophoria; eighth day showed four degrees esophoria. The following glasses were ordered: Plus sphr. 1.50 combined with plus cyl. .50, ax. 90, both eyes.

15. Mr. F. M., age 55, referred March, 1900, had two degrees of R. H. and seven degrees of exophoria. After atropin had been used for four days, record showed that one degree of exophoria and one degree of R. H. only remained. No glasses were ordered.

16. Miss M. G. M., age 30, referred October, 1899, complained of severe headaches. I examined her eyes and found four degrees of exophoria. After atropin had been used for eight days a test was made which showed one degrree of exophoria. The following glasses were ordered: O. D. plus sphr. .25; O. S. plus cyl. .50, ax. 60; plus 2. added for reading.

17. Mrs. W. M., age 28, referred December, 1900. Had two degrees of R. H. and three degrees of exophoria. Atropin was used and tests made on the second, third, fourth, fifth and sixth visits. Each test showed no improvement, and when the last was made it showed only one degree of exophoria and no R. H.

18. Mrs. A. B., age 30, referred February, 1900. Had ten degrees of exophoria. After atropin had been used three days, it showed seven degrees of exophoria; fifth day showed five degrees; seventh day, three and one-half; eighth day, four degrees. At the end of two weeks there still remained from four to five degrees of exophoria.

19. Mrs. E. F. C., age 39, referred May, 1902. Had ten degrees of esophoria. After atropin had been used three days, a test was made which showed from four to six degrees. The fifth day showed four degrees, sixth day still showed four degrees. At the end of two weeks there was no change. The following glasses were ordered: Plus sphr. 1., for each eye.

20. Mrs. C. R. C., age 33, referred 1900. Had nine degrees of shifting exophoria. A test made the second day after the use of atropin showed four degrees; third day, showed four degrees; fourth day, two degrees; fifth day, one degree; sixth day showed no exophoria. Two weeks after, however, when the drops had been removed, there still remained one degree of exophoria. The following glasses were ordered: O. D.

plus sphr. 1. combined with sphr. 1. for reading; O. S. same.

21. Mr. M. P., age 15, referred October, 1899, had ten degrees of exophoria. A test made the second day after the use of tropin showed four degrees; third day, showed four degrees; fifth day showed six degrees; seventh day showed three degrees, and the tenth day still showed one degree. The following glasses were ordered: O. D. plus sphr. 1.50 combined with plus cyl. ax. 90; O. S. plus sphr. 1.50 combined with cyl. ax. 90.

22. Miss L. R., age 13, consulted me in 1900. She complained of severe headaches; had two degrees of R. H. and eleven degrees of exophoria. The second day after the use of atropin examination showed nine degrees of exophoria and five degrees of R. H.; fifth day one degree of R. H., and eleven of exophoria; eight day, seven degrees of exophoria and no R. H., and the tenth day showed three degrees of exophoria. Atropin was again used for three days, at the end of which time, there still remained three degrees of exophoria.

23. Miss M. H., age 18, referred 1900. Had six degrees of L. H. and eleven degrees of exophoria. Four days after the use of atropin a test was made which showed eight degrees of exophoria; six days after showed six degrees of exophoria; seven days after showed six degrees. Another test was made two weeks after, which showed five degrees of exophoria. The following glasses were ordered: O. D. plus cyl. 1.25, ax. 180; O. S. plus cyl. 1, ax. 160.

24. Miss H., age 18, referred 1899. Had four degrees of shifting exophoria. Atropin was used and the defect reduced to one degree. The following glasses were ordered: O. D. plus sphr. .75; O. S. plus sphr. .75.

25. Miss A. K., age 13, referred May, 1897. Had seven degrees of exophoria. Atropin was continued for five days and reduced this defect to one degree. The following glasses were ordered: Minus sphr. 1, both eyes.

26. Miss M. L., age 14, referred April, 1898. Had two degrees of R. H. and ten degrees of exophoria. Atropin was continued for six days after which a test was made which showed no hyperphoria and from five to six degrees of exophoria. No glasses were ordered.

The following cases showed no improvement whatever after the use of atropin; however, practically all of them were neurotic young women:

1. Miss A. E. L., age 28, married four years; had two children. She was very nervous and intense; fond of society. She consulted me January 19, 1906, with three degrees of exophoria. Under the use of atropin for six days, there was apparently an improvement, but an examination made February 12th, after the drops had disappeared, showed a slight gain.

2. Miss Mary D., age 22, referred to me January 19, 1906. Had six degrees of exophoria. Atropin was continued for five days and an examination made at the end of that time showed no exophoria. Two weeks, however, after the drops were used, her eyes would remain straight momentarily, but shift back to six degrees. Patient was neurotic.

3. Miss Ada L., age 12, had eight degrees of esophoria. Atropin was used for four days without any improvement in the esophoria. I am convinced that had atropin been continued longer in this case, the results would have been very different, but I was unable to carry out the treatment.

4. Miss M., age 16, referred to me July, 1903. Had nine degrees of exophoria. She was very nervous and suffered severe headaches. Atropin was continued for six days without any improvement in the exophoria.

5. Mrs. J. H. W., age 25, referred March, 1908, had six degrees of exophoria. Atropin was used continuously for three weeks with no improvement whatever. I had the patient examined by a colleague, who was unable to find any organic trouble, but she was intensely neurotic.

6. Miss Hattie H., age 23, referred March, 1901. Had six degrees of exophoria. She was employed in the Post Office Department of the I. C. S.; was neurotic to a high degree, and the use of atropin for one week did not benefit her.

7. Miss Anna W., age 33, teacher, referred October, 1901. Had five degrees of exophoria. She complained of headaches for the past eight years, which were more often temporal. Atropin was used five days with absolutely no improvement.

8. Miss Agnes R., age 23, referred 1905. Had three degrees of exophoria. She suffered from headaches; was intensely nervous and almost on the point of melancholia. Atropin was used for nearly a week without any marked improvement. Between the years 1899 and 1903, atropin was used several times without effect.

Unfortunately, a complete record was not kept of the fol-

lowing cases. At that time I was not fully convinced of the qualities of this drug or the benefit that such cases might derive from it.

1. Miss B., age 25, referred July, 1903. Had six degrees of exophoria, and one degree of R. H. Atropin was ordered and continued for eight days. The first test made thereafter showed three degrees of exophoria and no hyperphoria.

2. Mr. G. E. D., age 32, referred October, 1903. Had six degrees of esophoria. Atropin was used eight days. A test was made the second day after its use which showed three degrees of esophoria; fourth day showed two degrees.

3. Mr. E. Z. S., age 16, referred September, 1901. Had eight degrees of exophoria. Atropin was used two days, when a test was made which showed seven degrees of exophoria. I have no further record other than that the exophoria was greatly improved. The treatment was entirely too short to be of any service.

4. Mr. J. H. T., age 47, referred August, 1898. Had five degrees of exophoria. Atropin was used eight days. Two weeks after a test was made which showed two degrees of exophoria.

5. Mrs. M. P., age 33, referred 1902. Had two degrees of exophoria. Atropin was used two days reducing the defect to one degree of exophoria.

6. Mrs. C. W. F., age 34, referred 1901. Had ten degrees of exophoria. A test made four days after the use of atropin showed from seven to eight degrees; seventh day after showed three degrees of exophoria.

7. Miss M. H., referred October, 1902. Had seven degrees of shifting exophoria. Atropin was used six days, when a test was made which showed three degrees of exophoria. The following glasses were ordered: O. D. plus cyl. 1., ax. 150; O. S. plus cyl. 1.50, ax. 1.25. I have no further record.

8. Miss K., age 25, referred June, 1902. Had six degrees of esophoria. The first day after the use of atropin showed seven degrees; third day showed four degrees.

9. Miss M. G., age 20, consulted me May, 1903. Had three degrees of esophoria. Complete defect under atropin was nine degrees of shifting esophoria. It was used six days, when a test was made showing four degrees; next test showed two degrees.

Atropin was not continued long enough in the following cases:

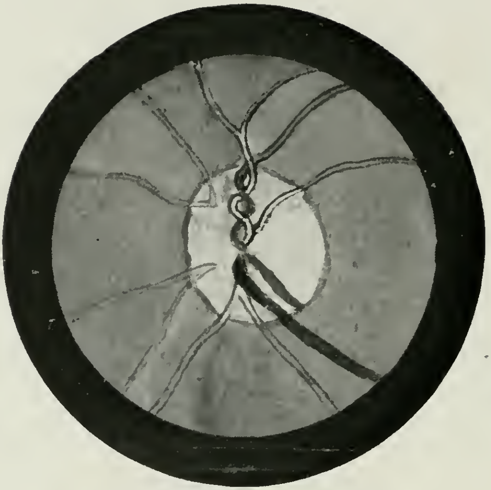
1. Mr. T. H., age 44, referred March, 1905. Had twenty-one degrees of esophoria. Atropin was used eight days and a test made at the end of that time showed only eight degrees. I am convinced that this would have been a complete recovery had the patient called a sufficient number of times.

2. Mr. R. S., age 18, referred May, 1906. Had one degree of esophoria, and six degrees of L. H. I saw this patient only twice and the drops were put in for three days. An ex-examination was made the second day, which showed no esophoria and four degrees of L. H.

3. Miss B. L., age 21, referred March, 1907. Had eight degrees of exophoria. This patient called several times, during which the drops were put in and an improvement noticed after three days' use. However, she did not call a sufficient number of times.

4. Miss T., referred October 1, 1900. Had eight degrees of esophoria, and atropin was used nine days. The following tests were made: Second day showed six degrees; fourth day, four degrees; fifth day, two and one-half degrees; eighth day, one degree. She discontiued treatment.

5. Mr. J. S., age 19, consulted me 1901. Had three degrees of exophoria. He called three days, during which time atropin was used and an improvement noticed. However, he failed to call after.



OPTICO-CILIARY VEIN.

OPTICO-CILIARY VESSELS; REPORT OF A CASE.

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My attention was called to this case by Dr. A. C. Sautter, my assistant at the German Hospital, out-patient department. It is put on record simply as an example of a congenital anomaly which is said to be exceedingly rare, not more than ten or twelve true cases having been reported, although doubtless, many more have been seen.

In the left eye of a male Hebrew is an optico-ciliary vein running apparently from the inferior papillary vein near the center of the disk, outward and downward to the disk margin where it abruptly disappears beneath the retina into the chorioid. (See sketch by Dr. Mary Buchanan.) It is covered by nerve fibers of the disk through which it is seen appearing light red in color and resembling more an artery than a vein. It pulsates, and pressure on the eyeball causes its immediate collapse together with collapse of the other veins. Aside from this anomalous vessel, both eyes are without fundus change of any importance. The refraction is hyperopia 2. D., and the vision each eye is 5/5. There is no history or evidence of previous inflammation or ocular disease.

Although the retinal and chorioidal circulations of the eye are quite independent, as established by Leber and others years ago, three exceptions are to be found in the cilio-retinal vessel, the chorioido vaginal, or posterior vortex vein, and the optico-ciliary vessel.

There are, moreover, anastomoses between twigs of the chorioidal and central vessels around the nerve entrance. Leber holds that these anastomoses take place in three directions—

1. Backward to the pial sheath.
2. Straight inward to the region of the lamina cribrosa.
3. Forward to the papilla.

These anastomoses are not to be confounded with the circle of Zinn, which is composed entirely of arteries, has to do with the scleral part of the nerve entrance, and is without a corresponding venous system. These two anastomosing circles around the nerve head it would seem have much to do with the explanation of abnormal vascular conditions congenital and acquired in their locality.

Cilio-retinal arteries, for example, have been proven by Elschnig to be always branches of the circle of Zinn. A cilio-retinal vein, one of the rarest of anomalies, is probably generally pseudo as such; *i. e.,* a modification of some other condition, or not a true companion of the artery.

Chorioido-vaginal or posterior vortex veins are large veins passing through the chorioid toward the disk and disappearing at the disk margin. They have been seen almost exclusively in cases of high myopia and have been thought to bear some relation to progressive myopia. Although they have been the subject of much speculation and theorizing, Coats says that up to the present time (1906) practically nothing has been done pathologically to elucidate their appearance, and that there is no exact knowledge as to what becomes of the veins after their disappearance, and into what vessels their blood is poured.

He considers the explanation of Van Geuns, that they arise from an unusual development of the normal anastomoses around the nerve entrance, as by far the best. Although they are frequently very large and gather blood from a wide distribution, as do the vortex veins, they are, according to those who have made special study of them, *not* vortex veins, and Parsons in concluding quite a lengthy discussion of the subject, taken largely from Coats, says that the proper name is chorioido-vaginal veins, and that the term posterior vortex veins should be given up, as it implies that they are abnormally placed vortex veins, a supposition untenable both on practical and theoretical grounds. Chorioido-vaginal describes their anatomical course.

Concerning optico-ciliary vessels still less is known. They are vessels which run from the central or papillary vessels to the disk margin and there disappear under the retina into the chorioid. It should be remembered that such vessels may be acquired during the progress of papillitis, glaucoma, etc., in which case they probably represent the dilatation of vascular twigs previously too small for observation. The acquired variety is much more common than the congenital.

Ten cases of true congenital optico-ciliary vessel, including the present case, have been reported. Of these two were arteries, eight were veins, and in one case (Braune) the anomaly was bilateral. So far as I know, my case is the only one reported from this country. The first case of optico-ciliary vessel, an artery, was shown by Benson in 1883 as "an unusual course taken by a branch of the central artery of the disk." A picture of the eyeground is published in the Transactions of the Ophthalmological Society of the United Kingdom for 1883, but no explanation of the anomaly is offered. In 1888, Elschnig reported the second case, a vein, discussed the condition and named it.

The second case of optico-ciliary artery is pictured in Oeller's Atlas of Rare Ophthalmoscopic Findings.

Niels Höeg (1903) comments on the rarity of the anomaly and considers its appearance in an otherwise normal eye as unique. That it is really rare and has not been overlooked on account of its insignificance, is shown, he says, by the fact that Salzmann and Elschnig searched carefully for many years for this anomaly, with the result that Salzmann had never seen a true case and Elschnig had seen but two.

The latest contribution to the subject which I am able to find is by Hugh Bloch, 1906. He considers two classes of cases, according to the direction taken by the blood in the vessel.

First, the blood flows from the chorioid toward the central vein; the condition is then analogous to the chorioido-vaginal vein. To this class belong the congenital cases.

Second, the blood flows from the central vein into the nerve sheath or chorioid;—a modified cilio-retinal vein. To this class belong the acquired cases.

My own idea of the present case is that it represents an errant chorioidal vein: that the vein has no connection with the ciliary veins, and would, therefore, be better named *optico-chorioidal* vein; and that were the eye highly myopic or the retinal pigment removed, we would see a so-called chorioido-vaginal vein, which, instead of ending at the sheath of the nerve, passed on to the central vein of the retina. With the little definite knowledge at hand the problem does not seem to me any more complex than here indicated.

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HEREDITARY BLINDNESS AND ITS PREVENTION.

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(Continued from the January Number.)

APPENDIX B.

References to four hundred and ninety-six cases of hereditary blindness.

Albinism.

I. Abadie. (1)

First and third children brunettes; second and fourth, albinos.

(Collateral heredity, 1 family; 4 children; 2 affected, 2 not.)

II. Arcoleo. (13)

Made a study of the albinos in Palermo. He found 24 families in which there were 62 albinos out of 136 children. Six albinos had married and had 24 children, none of whom were albinos. In 5 of the 24 families, the parents were related in the second canonical degree, and had 43 children, of whom 14 were albinos.

(Not statistically available.)

Tendency toward nystagmus and albinism in increasing degree in grandmother, mother and daughter.

(Direct heredity, 2 families; 2 mothers affected; 2 chil-

III Boehm. (48)

dren, both affected.)

IV. v. Förster. (117)

Sister and 2 brothers albinos. Several maternal cousins also.

(Collateral heredity, 1 family; 3 children, all affected.)

V. Hunter. (195)

Father albino; 6 children, all normal.

(Direct heredity, 1 family; father affected; 6 children, all normal.)

VI. Koren. (223)

2 children albinos; 1 cousin also.

(Collateral heredity, 1 family; 2 children, both affected.)

VII. Mayerhausen. (287)

2 out of a family of 14 children albinos.

(Collateral heredity, 1 family; 14 children; 2 affected, 12 not.)

VIII. Streatfield. (437)

3 out of 6 children albinos.

(Collateral heredity, 1 family; 6 children; 3 affected. 3 not.)

IX. Streatfield. (438)

(a) Brother, sister and stepbrother albinos; 2 other children normal; 6 children of one albino normal.

(b) Brother and sister albinos; her 3 children normal.

(Collateral heredity, 2 families; 7 children; 5 affected, 2 not. Direct heredity, 2 families; 1 father and 1 mother affected; 9 children, all normal.)

X. Syms. (443)

7 children alternately albino and brunette.

(Collateral heredity, 1 family; 7 children; 4 affected, 3 not.)

XI. Trousseau. (456)

3 cases albinism; 1 showed heredity; 1 showed heredity and consanguinity.

(Not statistically available.)

ANIRIDIA AND COLOBOMA IRIDIS.

I. Alexander. (8)

Mother and daughter bilateral irideremia.

(Direct heredity, 1 family; mother and 1 child affected.)

II. Benson. (33)

Mother and son congenital nystagmus, irideremia, microphthalmus, and cataract both eyes..

(Direct heredity, 1 family; mother and 1 child affected.)

III. Bergmeister. (34)

Patient had bilateral, total irideremia; 2 sons bilateral, total irideremia; 1 daughter normal eyes.

(Direct heredity, 1 family; father affected; 3 children; 2 affected, 1 not.)

IV. Blair and Potter (43)

Father had iris coloboma and cataract; 1 daughter had aniridia and coloboma chorioideae; 1 daughter had aniridia, coloboma lentis and anterior polar cataract.

(Direct heredity, 1 family; father and 2 children affected.)

V. Bloch. (45)

Father and son coloboma iridis.

(Direct heredity, 1 family; father and child affected.)

VI. Bock. (47)

1 brother had coloboma of the iris and chorioid, left eye. Another brother had same condition in both eyes.

(Collateral heredity, 1 family; 2 children, both affected.)

VII. Boggs. (49)

Mother and 2 children irideremia bilateralis totalis.

(Direct heredity, 1 family; mother and 2 children affected.)

VIII. Conradi (Konradi). (72)

Grandfather, father and son coloboma iridis.

(Direct heredity, 2 families; 2 fathers and 2 children affected.)

IX. Cunier. (76)

Aunt had irideremia and microphthalmus; nephew had microphthalmus and coloboma iridis.

(Indirect heredity, 1 family; 1 child affected.)

X. Daust. (83)

Father and daughter bilateral congenital coloboma iridis and cataract.

(Direct heredity, 1 family; father and 1 child affected.)

XI. DeBeck. (85)

I. (?), normal, 6 children.
II. a male, normal, no children.
b female, coloboma iridis, 3 children.

c female, coloboma iridis, 2 children.
d female, normal, 5 children.
e male, coloboma iridis, 2 children.
f female, normal, 6 children.
g female, coloboma iridis, no children.
h female, coloboma iridis, no children.

III.

Children IIb.
3 (?), normal.

Children IIc.
1 female, normal.
1 female, coloboma iridis.

Children IId.
5 (?), normal.

Children IIe.
1 male, normal.
1 female, coloboma iridis.

Children IIf.
6 (?), normal.

IV. (?), normal.

(The IV generation contains numerous members, whose ocular condition is unknown. It is, therefore, not statistically available. There is collateral heredity, 1 family; 8 children; 5 affected, 3 not. Direct heredity, 3 families; 2 mothers and 1 father affected; 7 children; 2 affected; 5 not.)

XII. De Benedetti. (86)

Father and 3 children had congenital aniridia followed by ectopia lentis, glaucoma, and blindness. 1 son had small coloboma iridis, otherwise normal.

(Direct heredity, 1 family; father and 4 children affected.)

XIII. Despagnet. (91)

31 members of one family had total aniridia.

(Not statistically available.)

XIV. Ewers. (107)

Mother coloboma iridis; child coloboma iridis et chorioideae.

(Direct heredity, 1 family; mother and 1 child affected.

XV. Felser. (110)

Father and 2 daughters had cataract and aniridia. 3 sons have cataract.

(Direct heredity, 1 family; father affected; 5 children; 2 affected, 3 not.)

XVI. Fichte. (111)

2 children coloboma iridis.

(Collateral heredity, 1 family; 2 children, both affected.)

XVII. Galezowski. (133)

I. female, irideremia bilateralis, 12 children.
II. a female, irideremia bilateralis, 12 children.
b female, irideremia bilateralis, 2 children.
10 (?) irideremia bilateralis, no children.
III.
Children IIa.
12 (?) irideremia bilateralis.
Children IIb.
2 (?) irideremia bilateralis.

(Direct heredity, 3 families; 3 mothers affected; 26 children, all affected.)

XVIII. Gleitsmann. (144)

Mother coloboma of iris right eye; daughter coloboma of iris and chorioid both eyes.

(Direct heredity, 1 family; mother and 1 child affected.)

XIX. Gutbier. (161)

I. male, aniridia, 8 children.
II. a male, aniridia, 4 children.
b male, aniridia, 2 children.
c male, aniridia, 1 child.
5 (?), normal, (?) children.
III.
Children IIa.
4 males, aniridia.
Children IIb.
1 female, aniridia.
1 male, normal.
Children IIc.
1 female, aniridia.

(Direct heredity, 4 families; 4 fathers affected; 15 children; 9 affected, 6 not.)

XX. Hagström. (163)

Mentions a family, every member of which had coloboma iridis.

(Not statistically available.)

XXI. Hamilton. (164)

5 members of one family had irideremia.

(Not statistically available.)

XXII. Henzschel. (174)

Father incomplete irideremia; 3 children complete bilateral irideremia; 2 children normal.

(Direct heredity, 1 family; father affected; 5 children; 3 affected, 2 not.)

XXIII. Heuner. (178)

Father and 3 children complete bilateral irideremia.

(Direct heredity, 1 family; father and 3 children affected.)

XXIV. Hoffman. (187)

Sister chorioidal coloboma; brother coloboma iris and chorioid.

(Collateral heredity, 1 family; 2 children, both affected.)

XXV. Hopf. (189)

Congenital aniridia in mother and 3 children.

(Direct heredity, 1 family; mother and 3 children affected.)

XXVI. Juler. (207)

Mother complete congenital aniridia left eye; right eye enucleated for glaucoma. Daughter complete congenital aniridia left eye; right eye glaucomatous.

(Direct heredity, 1 family; mother and 1 child affected.)

XXVII. Knape. (219)

Father aniridia, opacities of the lens; son aniridia and cataract.

(Direct heredity, 1 family; father and 1 child affected.)

XXVIII. Kraisky. (224)

Bilateral complete congenital aniridia in brother and sister; 4 other children normal.

(Collateral heredity, 1 family; 6 children; 2 affected, 4 not.)

XXIX. Lang. (233)

Mother and 2 children irideremia; 1 child normal.

(Direct heredity, 1 family; mother affected; 3 children; 2 affected, 1 not.)

XXX. Laskiewicz-Friedenfeld. (236)

Grandfather, father and 2 children aniridia and cataract.

(Direct heredity, 2 families; 2 fathers affected; 3 children, all affected.)

XXXI. Manz. (279)

Father bilateral irideremia congenita and cataract; son same and nystagmus also.

(Direct heredity, 1 family; father and 1 child affected.)

XXXII. Manz. (280)

Father and son bilateral congenital aniridia.

(Direct heredity, 1 family; father and son affected.)

XXXIII. Marty. (284)

Brother and sister coloboma iridis et chorioideae bilateralis.

(Collateral heredity, 1 family; 2 children; both affected.)

XXXIV. Maynard. (288)

Mother and son coloboma iridis.

(Direct heredity, 1 family; mother and 1 child affected.)

XXXV. Mittendorf. (291)

Father right eye 2 pupils. Daughter left eye 5 pupils.

(Direct heredity, 1 family; father and 1 child affected.)

XXXVI. Mohr. (292)

Mother bilateral total congenital irideremia; 2 sons incomplete irideremia.

(Direct heredity, 1 family; mother and 2 children affected.)

XXXVII. Moissonier and Pouchet. (293)

Mother total congenital aniridia; 1 daughter aniridia and ectopia lentis; 1 daughter aniridia and cataract; 1 son normal.

(Direct heredity, 1 family; mother affected; 3 children; 2 affected, 1 not.)

XXXVIII. Nicolini. (317)

Mother and 3 children complete irideremia.

(Direct heredity, 1 family; mother and 3 children affected.)

XXXIX. Page. (325)

Granddaughter, mother, maternal aunt and grandmother had irideremia and nystagmus.

(Direct heredity, 2 families; 2 mothers and 3 children affected.)

XL. Pfanmüller. (338)

E. S. coloboma chorioid and optic nerve both eyes; L. S. microphthalmus, coloboma iridis, coloboma chorioid; P. S. microphthalmus, coloboma iridis; 1 brother, born later, normal eyes.

(Collateral heredity, 1 family; 4 children; 3 affected, 1 not.)

XLI. Pflüger. (339)

Mother total irideremia; 1 child normal; 1 child phthisis bulbi congenitus sin. and microphthalmus dext.; 1 daughter and 2 sons irideremia totalis.

(Direct heredity, 1 family; mother affected; 5 children; 3 affected, 2 not.)

XLII. Polte. (345)

(A) Mother irideremia, luxation lens, nystagmus; son coloboma iris, cataract, nystagmus.

(B) Mother and 2 sons irideremia.

(Direct heredity, 2 families; 2 mothers affected; 3 children, all affected.)

XLIII. Posey. (348)

Mother coloboma iridis; daughter same but more pronounced.

(Direct heredity, 1 family; mother and 1 child affected.)

XLIV. Randall. (364½)

Complete congenital aniridia in mother; incomplete in daughter.

(Direct heredity, 1 family; mother and 1 daughter affected.)

XLV. Rosas. (375)

Mother coloboma iridis in both eyes; 1 child coloboma iridis dext.; 1 child coloboma iridis sin.; 3 normal.

(Direct heredity, 1 family; mother affected; 5 children; 2 affected, 3 not.)

XLVI. Ruete. (380)

2 brothers and 1 sister bilateral complete irideremia.

(Collateral heredity, 1 family; 3 children, all affected.)

XLVII. Ruete. (381)

Mother and daughter total bilateral irideremia.

(Direct heredity, 1 family; mother and 1 child affected.)

XLVIII. Selz. (407)

I. male, 60 years old, coloboma iridis et chorioideae cong. bilater.; cataract matur. oculi sin.; cataracta incip. oculi dext. 3 sons and 2 daughters. A cousin has coloboma iridis.

II. a male, coloboma chorioideae sin.; coloboma nervi optici sin., 3 children.

b, c, d, (?), normal.

e female, coloboma iridis et chorioideae sin.; zonular cataract sin., no children.

III. a female, coloboma iridis et chorioid. bilat. Microphthalmus.

b female, ibid. sin.

c male, ibid. dext.

(Direct heredity, 2 families; 2 fathers affected; 8 children; 5 affected, 3 not.)

XLIX. Stoeber. (431)

Grandfather lost sight right eye by accident; his daughter had microphthalmus and coloboma iridis left eye; 1 grandson had same right eye; 1 grandson had same both eyes.

(Not statistically available.)

L. Streatfield. (435)
(A) I. (?), normal. 2 children.
II. a male, coloboma iridis, no children.
b male, coloboma iridis, 2 children.
III. a female, normal, 7 children.
b male, coloboma iridis, 1 child.
IV.
Children IIIa.
3 males, coloboma iridis.
4 (?), normal.
Children IIIb.
1 male, coloboma iridis.

(Collateral heredity, 1 family; 2 children, both affected. Direct heredity, 2 families; 2 fathers affected; 3 children; 2 affected, 1 not. Indirect heredity, 1 family; 7 children; 3 affected, 4 not.)

(B)
I. male, coloboma, (?) children.
II. a (?), normal, 2 children.
b (?), normal, 2 children.
? (?), (?) (?) (?)
III.
Children IIa.
2 (?), coloboma.
Children IIb.
2 (?), coloboma.

(Indirect heredity, 2 families; 4 children; all affected. Direct heredity, 1 family; father affected; 2 children at least, both normal.)

LI. Streatfield. (436)
Father and son irideremia and congenital cataract.
(Direct heredity, 1 family; father and 1 child affected.)

LII. Strzeminski (439)
I. a female, zonular cataract.
b (?), irideremia.
c (?), irideremia.
d (?), atrophy optic nerve.
II. Children Ia.
1 (?), irideremia.
? (?), (?)
(Not statistically available.)

LIII. Theobald. (445)

Mother coloboma iridis; 2 children total irideremia.

(Direct heredity, 1 family; mother and 2 children affected.)

LIV. Thye. (451)

Father and son bilateral congenital defect iris, nystagmus, etc.

(Direct heredity, 1 family; father and 1 child affected.)

LV. Tockuss. (454)

(A) Mother irideremia totalis congenita bilat.; 2 sons same; 3 children normal.

(Direct heredity, 1 family; mother affected; 5 children; 2 affected, 3 not.)

(B) I. male, irideremia, 1 child.
II. female, irideremia, 7 children.
III. 1 male, irideremia.
6 (?), normal.

(Direct heredity. 2 families; 8 children; 2 affected, 6 not; 1 father and 1 mother affected.)

ANOPHTHALMUS AND MICROPHTHALMUS.

I. Appenzeller. (12)

Parents normal eyes; 2 children microphthalmus and congenital cataract.

(Collateral heredity, 1 family; 2 children, both affected.)

II. Arlt. (15)

Father, left eye, microphthalmus congenitus, coloboma iridis; right eye, coloboma chorioideae; son anophthalmus.

(Direct heredity, 1 family; father and 1 child affected.)

III. Benson. (33)

Mother and son congenital nystagmus, irideremia, microphthalmus, and cataract.

(Direct heredity, 1 family; mother and 1 child affected.)

IV. Berlin. (35)

1 child anophthalmus; 1 child microphthalmus bilateralis.

(Collateral heredity, 1 family; 2 children, both affected.)

V. Bronner. (55)

(A) Grandmother, mother and 4 children cataract and microphthalmus.

(B) Father and 4 children cataract, microphthalmus, and nystagmus; 4 children normal.

(Direct heredity, 3 families; 1 father and 2 mothers affected; 13 children; 9 affected, 4 not.)

VI. Brose. (56)

5 days old girl had right-sided anophthalmus and left-sided microphthalmus; her paternal grandfather had right-sided anophthalmus.

(Indirect heredity, 1 family; 1 child affected; direct heredity, 1 family; father affected; 1 child not affected.)

VII. Bruns. (60)

3 children microphthalmus; 3 normal eyes.

(Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

VIII. Cunier. (76)

I. female, microphthalmus.
II. (?), normal, 2 children.
III. a female, microphthalmus bilat., 1 child.
  b female, microphthalmus and irideremia, no children.
IV. male, microphthalmus bilat., coloboma iridis right eye.

(Direct heredity, 2 families; 2 mothers affected; 3 children; 2 affected, 1 not. Indirect heredity, 1 family; 2 children affected.)

IX. Fisher. (114)

Brother and sister anophthalmus sin. and microphthalmus dext.

(Collateral heredity, 1 family; 2 children, both affected.)

X. Fuchs. (129)

Father and son unilateral microphthalmus.

Direct heredity, 1 family; father and 1 child affected.)

XI. Gescheidt. (138)

I. a male, lost eye by trauma, 3 children.
  b male, normal.

II. .

Children Ia.

- a male, microphthalmus.
- b male, normal.
- c male, myopic, 2 children.

Children Ib.

- 2 (?), blind.

III.

Children IIc.

- 2 (?), blind in one eye.

(Not statistically available. Is given here on account of the interesting family history of trauma and ocular lesion in succeeding generations, probably not related to it etiologically.)

XII. Hirschberg. (185)

2 children microphthalmus and cataract.

(Collateral heredity, 1 family; 2 children, both affected.)

XIII. Katz. (209)

2 children anophthalmus.

(Collateral heredity, 1 family; 2 children affected.)

XIV. Lafosse. (229)

Mother microphthalmus congenitus dext.; child anophthalmus congenitus bilateralis.

(Direct heredity, 1 family; mother and 1 child affected.)

XV. Landesberg. (231)

Father anophthalmus congenitus dext.; child anophthalmus sin.

(Direct heredity, 1 family; father and 1 child affected.)

XVI. Manz. (281)

2 children of normal parents had microphthalmus.

(Collateral heredity, 1 family; 2 children, both affected.)

XVII. Martin. (283)

I. a male, microphthalmus, 6 children.
   b male, microphthalmus, 1 child.
   ? (?), normal.

II.

Children Ia.

- a female, microphthalmus, 5 children.
- b female, microphthalmus, 5 children.
- c female, microphthalmus, no children.
- d, e females, normal, no children.
- f male, normal, no children.

Children Ib.

- g female, microphthalmus, 1 child.

III.

Children IIa.

- 3 males, microphthalmus.
- 1 female, microphthalmus.
- 1 male. normal.

Children IIb.

- 2 (?), microphthalmus.
- 3 (?), normal.

Children IIg.

- 1 female, microphthalmus.

(Direct heredity, 2 lines of descent; 5 families; 2 fathers and 3 mothers affected; 18 children; 11 affected, 7 not.)

XVIII. Mayer. (286)

Brother and sister microphthalmic.

(Collateral heredity, 1 family; 2 children, both affected.)

XIX. Paly. (329)

(A) 2 children microphthalmus.

(B) 4 children microphthalmus.

(Collateral heredity, 2 families; 6 children, all affected.)

(C) Patient microphthalmus; mother, aunt and grandfather weak eyes.

(Not statistically available.)

XX. Pfanmüller. (338)

E. S. coloboma chorioid and optic nerves both eyes.

L. S. microphthalmus, coloboma iridis et chorioideae.

P. S. microphthalmus, coloboma iridis.

1 brother, born later, normal eyes.

(Collateral heredity, 1 family; 4 children; 2 affected, 2 not.)

XXI. Pönitz. (347)

2 brothers microphthalmus.

(Collateral heredity, 1 family; 2 children, both affected.)

XXII. Rava. (357)

I. female, microphthalmus and cataract, 4 children.

II. a female, microphthalmus and cataract, 2 children.

b female, microphthalmus and cataract.

c female, normal.

d female, normal.

III. a male, microphthalmus, coloboma iridis.

b male, microphthalmus, nystagmus.

(Direct heredity, 2 families; 2 mothers affected; 6 children; 4 affected, 2 not.)

XXIII. Reber. (367)

3 children, microphthalmus, etc.

(Collateral heredity, 1 family; 3 children; all affected.)

XXIV. Robertson. (371)

Father microphthalmus and bilateral cataract; son same and nystagmus.

(Direct heredity, 1 family; father and 1 child affected.)

XXV. Schaumberg. (387)

I. a male, microphthalmus, 1 child.

b male, microphthalmus, no children.

4 (?), normal, no children.

II. female, microphthalmus, 1 child.

III. male, microphthalmus.

(Collateral heredity, 1 family; 6 children; 2 affected, 4 not. Direct heredity, 2 families; 1 father and 1 mother affected; 2 children, both affected.)

XXVI. Schenkl. (389)

Mother and son microphthalmus.

(Direct heredity, 1 family; mother and 1 child affected.)

XXVII. Scherenberg. (390)

3 children microphthalmus; 3 normal; a paternal uncle and his daughter had some ocular disease, nature unknown.

(Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

XXVIII. Selz. (407)

2 children microphthalmus, etc.; 1 not microphthalmic.

(Collateral heredity, 1 family; 3 children; 2 affected, 1 not.)

XXIX. Stoeber. (431)

Grandfather lost sight right eye by accident; his daughter and her 2 sons had microphthalmus and coloboma iridis.

(Direct heredity, 1 family; mother and 2 children affected.)

XXX. Westcott. (473)

2 children double congenital microphthalmus.

(Collateral heredity, 1 family; 2 children; both affected.)

XXXII. Wutzer. (490)

2 children microphthalmus.

(Collateral heredity, 1 family; 2 children, both affected.)

Atrophia Nervi Optici.

I. Alexander. (7)

3 brothers, one after another, had optic nerve atrophy; maternal uncle had poor vision, cause unknown.

(Collateral heredity, 1 family; 3 children, all affected.)

II. Batten. (25)

1 son and 2 daughters optic nerve atrophy; began at age 12; their mother also had same, beginning at age of 12. One of her sisters and 1 brother also affected.

(Direct heredity, 1 family; mother and 3 children affected. The collateral heredity is too indefinite to be used statistically.)

III. Batten. (26)

3 brothers, ages 22-27, had optic neuritis and atrophy of the optic nerves. 1 brother had lead line on gums; others not. Parents, 1 brother and 1 sister normal.

(Collateral heredity, 1 family; 5 children; 3 affected, 2 not.)

IV. Bickerton. (42)

3 brothers and their maternal uncle had optic nerve atrophy.

(Indirect heredity, 1 family; 3 children: all affected.)

V. Brown. (58)

Two brothers had optic nerve atrophy associated with Frederich's disease.

(Collateral heredity, 1 family; 2 children, both affected.)

VI. Browne. (59)

3 brothers developed atrophy of the optic nerves at the ages of 23, 27 and 33. The parents and 3 sisters had normal eyes.

(Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

VII. Daguenet and Galezowski. (79)

3 brothers and 2 cousins, all sons of 3 mothers, with normal eyes, and their maternal uncle had optic nerve atrophy at about age of 21.

(Indirect heredity, 1 family; 5 children, all affected.)

VIII. Despagnet. (92)

4 brothers, 1 sister and her son had hereditary optic neve atrophy.

(Collateral heredity, 1 family; 5 children, all affected. Direct heredity, 1 family; mother and 1 child affected.)

IX. Dodd. (95)

2 sisters had optic nerve atrophy about age 12; 1 sister had normal eyes; 3 sisters died in infancy.

(Collateral heredity, 1 family; 3 children; 2 affected, 1 not; 3 children not counted on account of early death.)

X. Emrys-Jones. (105)

9 children, 4 dead, 1 boy and 1 girl optic nerve atrophy, 3 children normal sight.

(Collateral heredity, 1 family; 9 children; 2 affected, 7 not.)

XI. Förster. (119)

A large number of women having atrophy of the optic nerves were at the same time either completely or prematurely sterile.

XII. Fuchs. (128)

(A) 3 brothers atrophy of the optic nerves; 4 sisters and 1 brother normal.

(B) 2 brothers atrophy of the optic nerves; 4 sisters normal. 1 of these sisters has 4 sons, all atrophy of the optic nerves, and 1 daughter with normal eyes.

(C) 3 brothers atrophy of the optic nerves.

(Collateral heredity; 3 families; 17 children; 8 affected, 9 not. Indirect heredity, 1 family; 5 children; 4 affected, 1 not.)

XIII. Galezowski. (132)

4 out of 166 cases of optic nerve atrophy were hereditary.

(Not statistically available.)

XIV. Gould. (148)

I. male, optic nerve atrophy, 2 children.
II. a male, optic nerve atrophy, 5 children.
b male, optic nerve atrophy, no children.
III. a male, optic nerve atrophy, 15 children.
b male, optic nerve atrophy, no children.
c female, normal, 10 children.
d female, optic nerve atrophy, no children.
e female, normal, 8 children.
IV.
Children IIIa.
a-n (?), normal, no children.
Children IIIc.
o female, normal, died age 1 yr.
p female, normal, died age 1 yr.
q female, normal, 8 children.
r male, normal, 8 children.

s male, normal, 7 children.
t male, optic nerve atrophy, 4 children.
u female, normal, 4 children.
v, w males, normal, no children.
x female, normal, died age 1 yr.

Children IIIe.
8 (?), normal.

V.

Children IVq.
a, b males, normal, died age 1 yr.
c, d males, atrophy optic nerves, no children.
e male, atrophy optic nerves, 1 child.
f female, normal, 7 children.
g, h males, normal, died age 1 yr.

Children IVr.
i male, optic nerve atrophy, 6 children.
j-p males, normal, 8 children.

Children IVs.
q-w (?), normal.

Children IVt.
x male, optic nerve atrophy, no children.
y male, optic nerve atrophy, 2 children.
z male, optic nerve atrophy, no children.
aa male, normal, died age 1 yr.

VI.

Children Ve.
a female, normal, died age 13.

Children Vf.
b male, optic nerve atrophy.
c-h (?), normal.

Children Vi.
i-n (?), normal.

Children Vj.
o-v (?), normal.

Children Vy.
w, x (?), normal.

(Direct heredity, 7 families; 7 fathers affected; 34 children; 8 affected, 26 not. Indirect heredity, 4 families; 33 children; 6 affected, 27 not.)

XV. v. Graefe. (151)

Father myopic, otherwise normal; 3 sons became blind about age 20.

(Collateral heredity, 1 family; 3 children, all affected.)

XVI. Gunn. (159)

Mother always has had bad sight; disks pale, fields of vision contracted; 1 son 4 years old, and 1 daughter 8 years old likewise affected; 1 child 2½ years old good sight.

(Direct heredity, 1 family; mother affected; 3 children; 2 affected; 1 not.)

XVII. Habershon. (162)

Reports 1 case of his own and 6 of Nettleship.

(Not statistically available.)

XVIII. Hanke. (166)

2 brothers had optic nerve atrophy.

(Collateral heredity, 1 family; 2 children, both affected.)

XIX. Haskell. (169)

I. (?), normal, 4 children.
II. a male, optic nerve atrophy, 7 children.
  b female, optic nerve atrophy, 9 children.
  c female, optic nerve atrophy, (?) children.
  d male, optic nerve atrophy, (?) children.
III.
Children IIa.
  a-g (?), normal, no children.
Children IIb.
  h-m males, optic nerve atrophy, (?) children.
  n male, normal.
  o female, normal, (?) children.
  p female, normal, 8 children.
IV.
Descendants of IIIh, IIIi, IIIj, IIIk, IIIl, IIIm.
  ? (?), normal.
Children IIIp.
  1 male, optic nerve atrophy.
  7 females, normal.

V.

All very young.

(Direct heredity, 2 families; 1 father and 1 mother affected; 16 children; 6 affected, 10 not. Collateral heredity, 1 family; 4 children, all affected. Indirect heredity, 1 family, IIb to IV; 8 children; 1 affected, 7 not. Families IIc, IId, IIIh-IIIm not counted as condition of children is not given; V still too young.)

XX. Higgens. (179)

3 brothers out of a family of 12 had optic nerve atrophy; 7 died when very young, 2 normal.

(Collateral heredity, 1 family; 5 children; 3 affected, 2 not; 7 not counted on account of early death.)

XXI. Higier. (180)

(A) 2 brothers and a maternal uncle had neuritis optica.

(Indirect heredity, 1 family; 2 children, both affected.)

(B) Brother and sister optic nerve atrophy.

(Collateral heredity, 1 family; 2 children, both affected.)

XXII. Holz. (188)

3 brothers, ages 18, 15 3-4, 22, atrophy optic nerves; 1 brother and 1 sister normal.

(Collateral heredity, 1 family; 5 children; 3 affected, 2 not.)

XXIII. Hormuth. (190)

(A) Patient and 3 maternal cousins atrophy optic nerves.

(Not statistically available.)

(B) 2 brothers atrophy optic nerve.

(C) 2 brothers and maternal uncle atrophy optic nerve.

(D) 3 brothers and maternal great uncle atrophy optic nerve.

(E) 2 cousins and maternal uncle atrophy optic nerve.

(F) 2 brothers and 1 sister atrophy optic nerve; 2 sisters normal.

(G) 2 brothers atrophy optic nerve.

(H) 2 brothers atrophy optic nerve; 6 other children normal.

(I) 2 brothers atrophy optic nerve.

(Collateral heredity, 5 families; 19 children; 11 affected, 8 not. Indirect heredity, 3 families; 7 children, all affected.)

Second Series.

(J) 2 brothers atrophy optic nerve.

(K) 2 brothers atrophy optic nerve.

(L) 2 brothers and maternal uncle atrophy optic nerve; 1 sister myopic.

(M) Patient and maternal uncle atrophy optic nerve.

(O) 2 brothers atrophy optic nerve.

(Collateral heredity, 3 families; 6 children, all affected. Indirect heredity, 2 families; 4 children; 3 affected, 1 not.)

(N) Patient and 3 cousins, 2 of whom were brothers, had atrophy optic nerves.

(Leaving out the patient and one cousin, we have collateral heredity, 1 family, 2 children, both affected.)

XXIV. Hutchinson. (197)

(A) 4 out of 8 children optic nerve atrophy.

(B) 2 out of 7 children optic nerve atrophy.

(C) 2 children of first cousins atrophy optic nerves.

(Collateral heredity, 3 families; 17 children; 8 affected, 9 not.)

XXV. Hutchinson. (198)

Mother and 2 sons optic nerve atrophy.

(Direct heredity, 1 family; mother and 2 children affected.)

XXVI. Katz. (209)

3 cases of atrophy optic nerves in children of related parents.

(Collateral heredity, 1 family; 3 children, all affected.)

XXVII. Keersmaecker. (213)

Nephew and 4 maternal uncles atrophy optic nerves.

(Indirect heredity, 1 family; 1 child, affected. Collateral heredity, 1 family; 4 children, all affected.)

XXVIII. Klopfer. (218)

3 brothers optic nerve atrophy.

(Collateral heredity, 1 family; 3 children, all affected. Author quotes 209 cases from others, reported in this paper under names of respective authors—making 213 cases altogether.)

XXIX. König. (221)

Patient, maternal great uncle, uncle and cousin optic nerve atrophy.

(Direct heredity, 1 family; father and child affected. Indirect heredity, 2 families; 2 children, both affected.)

XXX Lauber. (237)

Maternal great-grandfather blind, cause unknown. Grandparents and parents normal; 14 children; 4 males and 2 females died before 11 years of age; 3 females and their children normal; 4 males and 1 female optic nerve atrophy.

(Collateral heredity, 1 family; 2 children; 5 affected, 3 not; 6 children are not counted, on account of dying before age at which disease manifests itself.)

XXXI. Lawson. (242)

Mother, atrophy left optic nerve; son, both eyes affected at 10 years of age.

(Direct heredity, 1 family; mother and 1 child affected.)

XXXII. Leber. (245)

Quotes all cases known in previous literature; 13 references in all. Was the first to describe this condition as a pathologic entity.

(A) Woman married twice; 3 sons by first husband, 2 by second; 1 daughter, the mother herself, and her parents had normal eyes; 2 of the mother's brothers and all of her sons, latter at ages 13-28, had retrobulbar neuritis; 3 grandchildren, very young, unaffected.

(Indirect heredity, 1 family; 6 children, 5 affected, 1 not.)

(B) Father normal eyes; mother senile cataract; 2 sisters and 1 brother normal eyes; 2 brothers and

1 sister have retrobulbar neuritis, and neuro-retinitis optica.

(Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

(C) Parents and 2 daughters free; 1 son and 1 daughter, atrophy optic nerve.

(Collateral heredity, 1 family; 4 children, 2 affected, 2 not.)

(D) Reported at greater length by Vossius, q. v.

XXXIII. Leber. (246)

Quotes from several authors, q. v.

XXXIV. Leitner. (250)

(A) 6 cases in 2 generations, all men.

(Not statistically available.)

(B) Brother and sister optic nerve atrophy; 4 other children normal; 3 sons of 3 unaffected females optic nerve atrophy.

(Collateral heredity, 1 family; 6 children; 2 affected, 4 not. Indirect heredity, 3 families; 3 children, all affected.)

XXXV. Linde. (253)

Mother and child bilateral optic nerve atrophy.

(Direct heredity, 1 family; mother and child affected.)

XXXVI. Lor. (255)

1 brother and 2 sisters optic nerve atrophy.

(Collateral heredity, 1 family; 3 children, all affected.)

XXXVII. Magers. (272)

(A) Maternal uncle and twin nephews had optic nerve atrophy; 10 brothers and sisters normal.

(Indirect heredity, 1 family; 12 children, 2 affected, 10 not.)

(B) 3 generations of males began to lose their sight about age 20.

(This is also reported by Vossius, q. v.)

XXXVIII. Magnus. (274)

(9) Father atrophy optic nerve; 1 child normal.

(15) Father atrophy optic nerve; 2 children normal.

(17) Mother atrophy optic nerve; 2 children normal.

(19) Father atrophy optic nerve; 2 children normal.

(Direct heredity, 4 families; 3 fathers and 1 mother affected; 7 children, all normal.)

XXXIX. Moore. (296)

(A) 3 brothers and 1 uncle optic nerve atrophy.

(Indirect heredity, 1 family; 3 children; all affected.)

(B) 3 brothers optic nerve atrophy.

(C) 2 brothers optic nerve atrophy.

(D) 2 brothers optic nerve atrophy.

(Collateral heredity, 3 families; 7 children all affected.)

XL. Müller. (304)

3 brothers atrophy optic nerves; 1 brother and 2 sisters still normal, ages 9-13.

(Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

XLI. Nicolai. (316)

(A) 1 brother, age 32, and 1 age 29, neuritis optica.

(Collateral heredity, 1 family; 2 children, both affected.)

(B) Uncle and nephew neuritis optica.

(Indirect heredity, 1 family; 1 child affected.)

XLII. Norris. (320)

I. male, optic nerve atrophy, 1 child.
II. male, optic nerve atrophy, 1 child.
III. female, optic nerve atrophy, 3 children.
IV. a female, normal, 10 children.
  b female, optic nerve atrophy, 1 child.
  c male, optic nerve atrophy, 1 child.
V.
Children IVa.
  3 males, optic nerve atrophy.
  2 females, normal.
  5 (?), normal; died in infancy, not counted.
Children IVb.
  1 male, atrophy optic nerve.
Children IVc.

1 (?), atrophy optic nerve.

(Direct heredity, 5 families; 3 fathers and 2 mothers affected; 7 children; 6 affected, 1 not. Indirect heredity, 1 family; 5 children; 3 affected, 2 not. 5 others died in infancy, not counted.)

XLIII. Ogilvie. (322)

3 brothers optic nerve atrophy, ages 22, 24, 26. All other children died in infancy.

(Not statistically available.)

XLIV. Paly. (329)

(1) Uncle and nephew optic nerve atrophy.

(Indirect heredity, 1 family; 1 child affected.)

(2) Patient and 1 brother optic nerve atrophy.

(3) Patient and 1 brother optic nerve atrophy.

(4) Patient and 1 brother optic nerve atrophy.

(5) Patient and 1 brother optic nerve atrophy.

(Collateral heredity, 4 families; 8 children, all affected.

(6) Father and 2 children optic nerve atrophy.

(7) Grandfather and 3 grandchildren optic nerve atrophy.

(Direct heredity, 2 families; 2 fathers affected; 3 children; 2 affected, 1 not. Indirect heredity, 1 family, 3 children, all affected.)

(8) 2 brothers blind, atrophy optic nerve; 2 sisters weak eyes.

(9) Patient atrophy optic nerve; mother blind.

(10) Patient atrophy optic nerve; grandmother blind; sister cataract.

(11) 2 brothers atrophy optic nerve; 2 sisters with eye disease.

(Cases 8, 9, 10, 11, are not statistically available.)

(12) Father and 2 children optic nerve atrophy; 2 children normal.

(13) Mother and 2 children atrophy optic nerve.

(14) Grandmother, father, 2 grandchildren, optic nerve atrophy.

(Direct heredity, 4 families; 2 fathers and 2 mothers affected; 9 children; 7 affected, 2 not.)

XLV. Prouff. (349)

Father and son heredity optic nerve atrophy. Are respectively uncle and cousin case described by Daguenet and Galezowski, q. v.

(Direct heredity, 1 family; father and 1 child affected.)

XLVI. Pufahl. (350)

3 brothers and maternal uncle optic nerve atrophy; 3 sisters normal eyesight.

(Indirect heredity, 1 family; 6 children; 3 affected, 3 not.)

XLVII. Pufahl. (351)

2 brothers and 3 maternal uncles optic nerve atrophy.

(Collateral heredity, 1 family; 3 children, all affected. Indirect heredity, 1 family; 2 children, all affected.)

XLVIII. Rampoldi. (360)

I. male, optic nerve atrophy, 2 children.
II. a male, optic nerve atrophy, 1 child.
b female, optic nerve atrophy, 2 children.
III.
Children IIa.
a male, optic nerve atrophy, no children.
Children IIb.
b male, optic nerve atrophy, 1 child.
c male, optic nerve atrophy, no children.
IV. male, optic nerve atrophy, no children.

(Direct heredity, 4 families; 3 fathers and 1 mother affected; 6 children; all affected.)

XLIX. Schleuter. (392)

(A) I. female, myopia, 3 children.
II. a male, poor vision, age 25, no children.
b female, normal, 2 children.
c female, normal, 3 children.
III.
Children IIb.
a male, optic neuritis.
b female, normal.
Children IIc.
c, d males, poor vision ages 17-20.
e female, normal.

(Not statistically available.)

(B) I. (?), normal, 3 children.
- II. a male, optic nerve atrophy, no children.
  - b female, normal, 2 children.
  - c female, normal, 2 children.
- III.
- Children IIb.
  - a male, optic nerve atrophy.
  - b female, optic nerve atrophy.
- Children IIc.
  - c, d males, optic nerve atrophy.

(Indirect heredity, 2 families; 4 children, all affected.)

(C) I. (?), normal, 2 children.
- II. a (?), normal, 1 child.
  - b (?), normal, 3 children.
- III.
- Children IIa.
  - a female, poor vision.
- Children IIb.
  - b, c males, poor vision.
  - d female, normal, 4 children.
- IV.
- Children IIId.
  - 1 male, optic nerve atrophy.
  - 3 (?), normal.

(Not statistically available.)

L. Schmidt-Rimpler. (397)

Heredity also plays a part in optic nerve atrophy. There have been families observed where the members for several generations became blind at a certain age.

(Not statistically available.)

LI. Schoeler and Uhthoff. (401)

3 out of 100 cases of optic nerve atrophy were on hereditary basis.

(Not statistically available.)

LII. Siegheim. (409)

(26) 2 brothers atrophy optic nerve; 1 brother retinitis pigmentosa.

(Collateral heredity, 1 family; 3 children; 2 affected, 1 not.)

LIII. Snell. (416)

(1) 5 out of 8 children optic nerve atrophy, 21-32 years.

(2) 2 brothers optic nerve atrophy 17 years.

(3) 2 brothers optic nerve atrophy 20-24 years.

(4) 2 brothers and 1 sister optic nerve atrophy 13-16 years.

(5) 3 brothers optic nerve atrophy 52, 49, 35 years.

(Collateral heredity. 5 families; 18 children; 15 affected, 3 not.)

LIV. Somya. (419)

Patient, mother, 2 of her 3 brothers and 2 maternal male cousins atrophy optic nerve; family of maternal grandmother also affected.

(Direct heredity, 3 families; 1 mother and 2 fathers affected; 3 children; all affected. Collateral heredity, 1 family; 4 children; 3 affected, 1 not.)

LV. Strzeminski. (440)

I. female, suden loss sight age 25, central scotoma.
II. female, atrophy optic nerve, 5 children.
III. 2 males, atrophy optic nerve,.
3 males, less than normal sight.
IV. all below 15 years.

(Direct heredity, 2 families; 2 mothers affected; 3 children, all affected. 3 children not counted on account of defective history; IV not counted because too young to be affected.)

LVI. Syms. (442)

I. female, blind age 51.
II. 2 females, normal.
3 males, blind ages 20, 35, 25.
III. all below 20, see well.

(Direct heredity, 1 family; mother affected; 5 children; 3 affected, 2 not.)

LVII. Taylor. (333)

Maternal grandfather blind age 40; 4 out of 11 grandchildren, ages 27, 21, 18, 46, optic nerve atrophy.

(Indirect heredity, 1 family; 11 children; 4 affected, 7 not. Direct heredity, 1 family; mother affected; 1 child not affected.)

LVIII. Thompson. (448)

6 brothers and 2 maternal uncles suffered from retrobulbar neuritis.

(Collateral heredity, 1 family; 2 children; both affected. Indirect heredity, 1 family; 6 children, all affected.)

LIX. Thompson. (449)

Patient and maternal uncle optic atrophy.

(Indirect heredity, 1 family; 1 child affected.)

LX. Velhagen. (461)

3 brothers atrophy optic nerve.

(Collateral heredity, 1 family; 3 children; all affected.)

LXI. Velhagen. (462)

2 brothers, an uncle and 1 cousin diseased at age of 21 years.

(Indirect heredity, 2 families; 3 children; all afected.)

LXII. Vossius. (467)

3 males, children of 2 sisters, began to lose sight at ages 17-27; condition progressed to great loss of sight with atrophy optic nerves. The mothers of the patients themselves had normal eyes, but a brother of theirs began to lose his sight at about 16. His children, 2 girls and 2 boys, are aged 16-24, and have normal sight. His mother has normal sight, but 2 brothers had atrophy of optic nerves at ages 20-21.

(Collateral heredity, 1 family; 5 children; 3 affected, 2 not. Indirect heredity, 2 families; 3 children; all affected. Direct heredity, 1 family; father affected; 4 children; all normal.)

LXIII. Wagenmann. (468)

(A) Twin brothers about 16 years of age, optic nerve atrophy.

(Collateral heredity, 1 family; 2 children affected.)

(B) I (?), normal, 3 children.
II. a male, optic nerve atrophy, no children.
b male, optic nerve atrophy, no children.
c female, normal, 3 children.

III. a male, optic nerve atrophy, no children.
b female, normal, 1 child.
c female, normal, 1 child.

IV.

Children IIIb.
1 male, optic nerve atrophy.

Children IIIc.
1 male, optic nerve atrophy.

(Indirect heredity, 3 families; 5 children; 3 affected, 2 not. Collateral heredity, 1 family; 3 children; 2 affected, 1 not.)

LXIV. Westhoff. (474)

I. (?), normal, 3 children.

II. a female, normal, 4 children.
b male, optic nerve atrophy, 5 children.
c male, optic nerve atrophy, 4 children.

III.

Children IIa.
a male, optic nerve atrophy, no children.
b female, normal, 6 children.
c male, optic nerve atrophy, no children.
d male, optic nerve atrophy, 1 child.

Children IIb.
e-i (?), normal, 12 children.

Children IIc.
j-m (?), normal, 4 children.

IV.

Children IIIb.
1 female, normal.
5 males, optic nerve atrophy.

Children IIId.
1 (?), normal, 3 years old.

Children IIIi, IIIj, IIIk, IIIl, IIIm, all normal.

(Child IIId still too young to be affected—not counted. Direct heredity, 2 families; 2 fathers affected; 9 children, all normal. Indirect heredity, 2 families; 10 children; 9 affected, 1 not. Collateral heredity, 1 family; 3 children; 2 affected, 1 not.)

LXV. Wetz. (476)

Found in the Giessen Clinic that 4.3 per cent of descending optic neuritis was hereditary. It occurred about the ages 20-27, and only males were affected.

CATARACT.

I. Abelsdorf. (2)

Lamellar cataract in mother and daughter.

(Direct heredity, 1 family; mother and daughter affected.)

II. Sir W. Adams. (3)

(A) 3 children out of 4 had cataract.

(B) 2 brothers congenital cataract.

(Collateral heredity, 2 families: 6 children: 5 affected, 1 not.)

(C) Father and 2 children cataract.

(D) I. male, cataract, 1 child.
  II. male, cataract, 7 children.
  III. 5 males, cataract,.
    2 females, normal.

(Direct heredity 3 families: 3 fathers affected: 10 children; 8 affected, 2 not.)

III. Adamück. (4)

Mother cataract at the age of 30, daughter congenital cataract.

(Direct heredity, 1 family: mother and daughter affected.)

IV. Alessi. (6)

I. male, congenital cataract; all of his children affected.

II. male, congenital cataract; he married a female with congenital cataract from the same family. All of his 17 children who resembled him had cataract.

III. male, congenital cataract, 15 children.

IV. female, congenital cataract, 9 children.

V. All nine had congenital cataract.

(In this family, the history is indefinite except in the last generation, which alone can be used. Direct heredity, 1 family: mother and 9 children affected.)

V. Appenzeller. (12)

Reviews the literature and reports 8 families from the Tübingen clinic.

(A) 3 children cataract, 4 normal.

(Collateral heredity, 1 family; 7 children; 4 normal, 3 cataract.)

(B) Mother normal eyes, married twice; first husband normal eyes, all children normal eyes. Second husband also had normal eyes, but all 3 children had cataract.

(Collateral heredity, 1 family; 3 children; all affected.)

(C) 2 children microphthalmus and congenital cataract.

(Collateral heredity, 1 family; 2 children; both affected.)

(D) Paternal grandfather poor vision, cause not given. Father cataract both eyes, with malformation corpus ciliare. 4 children same condition as father; 3 children normal eyes.

Direct heredity, 1 family; father affected; 7 children; 4 affected, 3 not.)

(E) Patient congenital cataract, 6 other children normal eyes. Parents had normal eyes, but several paternal uncles and aunts—number not given—had cataract.

(Indirect heredity, 1 family; 7 children; 1 affected, 6 not.)

(F) Father congenital cataract; 3 children same, 2 normal.

(Direct heredity, 1 family; father affected; 5 children; 3 affected, 2 not.)

(G) Father and son, congenital cataract.

(Direct heredity, 1 family; father and 1 child affected.)

(H) Daughter, mother and her brother cataracta mollis.

(Collateral heredity, 1 family; 2 children; both affected. Direct heredity, 1 family; mother and daughter affected.)

VI. Armaignac. (16)

I. male, cataract, 8 children.
II. 6 cataract and 2 normal, 11 children.
III. 3 cataract and 8 normal, 3 children.
IV. 2 cataract and 1 normal.

(Only the I and II generations can be used statistically, as the others do not show the relative conditions of parent and child. Direct heredity, 1 family; father affected; 8 children; 6 affected, 2 not.)

VII. v. Arx. (17)

(A) 2 children cataract.

(Collateral heredity, 1 family; 2 children; both affected.)

(B) Father and daughter cataract.

(Direct heredity, 1 family; father and 1 child affected.)

VIII. Baker. (22)

Grandfather and 3 grandchildren cataract; 1 son and 3 daughters normal.

(Indirect heredity, 1 family; grandfather and 3 grandchildren affected. Direct heredity, 1 family; father affected; 4 children, all normal.)

IX. Bastard. (24)

4 generations of one family with 15 cases of cataract.

(Not statistically available.)

X. Baudon. (27)

I. male, cataract, 7 children.
II. a (?), cataract, 4 children.
b (?), cataract, no children.
c (?), cataract, 4 children.
d (?), cataract, no children.
e (?), cataract, 1 child.
f, g (?), normal.
III.
Children IIa.
a, b, c (?), cataract, no children.
d (?), normal, no children.
Children IIc.
e (?), cataract, 1 child.
f (?), cataract, 1 child.
g (?), cataract, 1 child.
h (?), normal, 1 child.
Children IIe.
i (?), normal, no children.
IV.
Children IIIe.
a cataract.
Children IIIf, IIIg, IIIh.
b, c, d (?) all normal.

(Direct heredity, 7 families; sex of 7 parents unknown, but all affected; 19 children; 12 cataract, 7 normal.)

XI. Benson. (33)

Mother and son had congenital nystagmus, microphthalmus, irideremia and cataract both eyes.

(Direct heredity, 1 family; mother and son affected.)

XII. Berry. (36)
I. (?), normal, 2 children.
II. a (?), normal, 1 child.
b (?), normal, 9 children.
III.
Children IIa.
a male, normal, no children.
Children IIb.
b female, cataract, married cousin, 9 children.
c, d females, cataract, no children.
e, f males, cataract, no children.
g, h, i, j females, normal, no children.
IV.
Children IIIb.
a, b, c, d, e males, normal, no children.
f, g males, cataract, no children.
h female, cataract, no children.
i female, cataract, 6 children.
V.
Children IVi.
a female, cataract, 5 children.
b male, cataract, no children.
c male, cataract, 2 children.
d female, cataract, 1 child.
e female, normal, 1 child.
f female, normal, no children.
VI.
Children Va
a male, normal, 10 children.
b female, cataract, 3 children.
c male, cataract (married twice), 4 children.
d male, cataract, 3 children.
e male, cataract, no children.
Children Vc.
f, g males, normal, no children.
Children Vd.
h female, normal, 1 child.

Children, Ve.
    i male, normal, no children.
VII.
Children VIa
    10 (?), all normal.
Children VIb.
    a female, cataract.
    b, c (?), normal.
Children VIc.
    d female, cataract.
    e, f, g (?), normal.
Children VId.
    h female, cataract.
    i, j (?), normal.
Children VIh.
    k, male, normal.

(Collateral heredity, 1 family; 9 children; 5 affected, 4 not. Direct heredity, 8 families; 3 fathers and 5 mothers affected; 33 children; 15 affected, 18 not.)

XIII. Blair and Potter. (43).

Father iris coloboma and cataract. 1 daughter aniridia and coloboma chorioideae; 1 daughter aniridia, coloboma lentis, aniridia and anterior polar cataract.

(Direct heredity, 1 family; father affected; 2 children; 1 affected, 1 not.)

XIV. Bock. (46)

Mother and all her children had congenital cataract. She came from a family, many members of which had cataract.

(Not statistically available.)

XV. Bresgen. (53)

Father had zonular cataract; 6 out of 8 children had the same.

(Direct heredity, 1 family; father affected; 8 children; 6 affected, 2 not.)

XVI. Bronner. (55)

(A) Grandmother, mother and 4 children microphthalmus and cataract.

(Direct heredity, 2 families; 2 mothers affected; 5 children, all affected.)

(B) Father and 4 children microphthalmus, cataract and nystagmus; 4 children normal eyes.

(Direct heredity, 1 family; father affected; 8 children; 4 affected, 4 not.)

XVII. Cahnheim. (63).

Father cataracta mollis sinistra; son cataracta congenita sin.

(Direct heredity, 1 family; father and son affected.)

XVIII. Carreas y Arago (65)

I. (?), normal, 2 children.
II. a male, normal, 1 child.
b male, normal, 1 child.
III.
Children IIa.
a male, normal, 1 child.
Children IIb.
b female, cataract, 1 child.
IV.
Children IIIa.
a female, cataract, 3 children.
Children IIIb.
b female, cataract, 1 child.
V.
Children IVa.
3 females, cataract.
Children IVb.
1 female, cataract.

(Indirect heredity, 1 family; 1 child affected. Direct heredity, 3 families; 3 mothers affected; 5 children, all affected.)

XIX. Chance. (66)

Father, 3 sons and 1 daughter bilateral, congenital cataract. Several members of the father's family had poor vision.

(Direct heredity, 1 family; father affected; 4 children; all affected.)

XX. Cooper. (73)

According to the then Duke of Sussex, cataract was brought into the royal family of England by the marriage of one of his ancestors to a princess of Saxe-Coburg-

Gotha. She had cataract, and many of her descendants had the same affliction. Among them were the Duke of Cumberland, who commanded at Fontenoy, George III, George IV, the Duke of Gloucester, the Duke of Sussex, Princess Sophia, and the King of Hannover.

(Not statistically available.)

XXI. Critchett. (74)

Father, 2 of his sisters, 7 cousins, 1 niece and 2 children had zonular cataract.

(The relation of the niece to the father's sisters is not given, making the data uncertain. There is, however, 1 family of direct heredity, father and 2 children affected. There is also 1 family of collateral heredity, 7 cousins, all affected.)

XXII. Cutler. (77)

3 sisters opacities of the lens, night blindness, etc. 4 brothers normal.

(Collateral heredity, 1 family; 7 children; 3 affected, 4 not.)

XXIII. Daust. (83)

Cases taken from the Kiel Eye Clinic, from 1879 to 1899.

(A) Father and daughter bilateral coloboma, iridis and cataract.

(Direct heredity, 1 family; father and 1 child affected.)

(B) Patient has bilateral cataract. Her father and several of her uncles and aunts have same condition. 4 brothers and sisters see badly.

(Not statistically available.)

(C) Patient, his grandfather and a paternal cousin had bilateral congenital cataract.

(Indirect heredity, 1 family; grandfather to 2 grandchildren. Direct heredity, 1 family; 1 father affected; 2 children not affected.)

(D) Patient, his father and grandfather, and all his brothers and sisters (number not given) had congenital cataract. 1 brother had a son with congenital cataract.

(Direct heredity, 3 families; 3 fathers affected and at least 4 children; none normal.)

(E) Patient, 4 of his 12 brothers and sisters, and a son had congenital cataract.

(Direct heredity, 1 family; father and son affected. Collateral heredity, 1 family, 13 children; 5 affected, 8 not.)

(F) Father and 6 children congenital cataract.

(Direct heredity, 1 family; father and 6 children affected.)

(G) Maternal grandmother had cataract when young; her grandson had congenital cataract.

(Indirect heredity, 1 family; grandmother to grandson. Direct heredity, 1 family, mother affected, 1 child not.)

(H) Maternal grandmother and grandson bilateral congenital cataract.

(Indirect heredity, 1 family; grandmother to grandson; direct heredity, 1 family; mother affected, daughter not.)

(I) Father and son congenital cataract.

(Direct heredity, 1 family; father and son affected.)

(J) Mother and son bilateral congenital cataract.

(Direct heredity, 1 family; mother and 1 child affected.)

(K) Mother and son bilateral congenital zonular cataract.

(Direct heredity, 1 family; mother and son affected.)

(L) Mother and 2 daughters became cataractous early in life.

(Direct heredity, 1 family; mother and 2 children affected.)

(M) Mother and 2 daughters bilateral zonular cataract.

(Direct heredity, 1 family; mother and 2 children affected.)

(N) Father and 4 children had juvenile cataract.

(Direct heredity, 1 family; father and 4 children affected.)

(O) Patient and maternal aunt had cataract.

(Indirect heredity 1 family; 4 children affected.)

(P) Patient and 2 maternal aunts had juvenile cataract

(Indirect heredity, 1 family; 1 child affected. Collateral heredity, 1 family; 3 children; 2 affected; 1 not.)

(Q) 2 brothers had cataract.

(Collateral heredity 1 family; 2 children; both affected.)

(R) 2 brothers bilateral zonular cataract.

(Collateral heredity. 1 family; 2 children; both affected.)

(S) Patient had bilateral zonular cataract; 1 sister bad eyes since birth.

(Not statistically available.)

(T) Patient and sister bilateral, congenital, zonular cataract.

(Collateral heredity, 1 family; 2 children; both affected.)

(U) 5 children had zonular cataract.

(Collateral heredity, 1 family; 5 children; all affected.)

(V) 4 children had zonular cataract.

(Collateral heredity, 1 family; 4 children; all affected.)

The author gives 8 other cases, but they are not statistically available. His conclusions are:

1. The heredity of congenital cataract is undeniable.
2. It is more frequent that we are accustomed to believe.
3. It is found in at least 15 per cent of all congenital cataracts, and in 0.05 per cent of all eye diseases.
4. It follows no exact law in propagating the disease.

XXIV. Derby. (89)

I. (?), normal, 3 children.

II. a female, bilat. zonular cataract, 4 children.
b male, bilat. zonular cataract, 3 children.
c male, bilat. zonular cataract, 1 child.

III.

Children, IIa.
4 all zonular cataract.

Children IIb.
2 zonular cataract.
1 normal.

Children IIo.
1 normal.

Collateral heredity, 1 family; 3 children; all affected.
Direct heredity, 3 families; 1 mother and 2 fathers affected; 8 children; 6 affected, 2 not.)

XXV. Dor. (98)

Father cataract; 1 son cataract; 7 children normal.

(Direct heredity; 1 family; father affected; 8 children; 1 affected, 7 not.)

XXVI. Dyer. (103)

I. male, cataract, 8 children.
II. a, b, c, d, e females, normal, no children.
f male, normal, no children.
g male, cataract, no children.
h male, cataract, 3 children.
III. a female, normal, no children.
b male, cataract, no children.
c male, cataract, 2 children.
IV. a. male, cataract.
b female, normal.

(Direct heredity, 3 families; 3 fathers affected; 13 children; 5 affected, 8 not.

XXVII. Enslin. (106)

I. male, cataract, 4 children.
II. a male, cataract, 14 children.
b male, cataract, 6 children.
c male, cataract, no children.
d male, cataract, no children.
III.
Children IIa.
a male, cataract, 1 child.
b male, normal, 3 children.
c, d, e females, normal, no children.
f, g, h, i, males, normal, no children.
j male, normal, no children.
k, l females, cataract, no children.
m, n males, cataract, no children.
Children, IIb.
unknown.
IV.
Children IIIa.
a female, cataract.
Children IIIb.
all normal.

(Direct heredity, 3 families; 3 fathers affected; 19 children; 10 affected, 9 not.)

XXVIII. Felser. (110)

Father and 2 daughters aniridia and cataract; 3 sons cataract.

In the family are numerous cases of inherited cataract.

(Direct heredity, 1 family; 5 children and father affected.)

XXIX. Fröbelius. (125)

I. female, cataract, 12 children.
II. a female, cataract, 5 children.
b female, cataract, 8 children.
c female, cataract, 4 children.
d female, cataract, 10 children.
8 (?), normal, no children.
III.
Children IIa.
3 (?), cataract.
1 (?), normal.
1 (?), unknown.
Children IIb.
2 (?), cataract.
6 (?), normal.
Children IIc.
1 (?), cataract.
3 (?), normal.
Children IId.
3 (?), cataract.
7 (?), normal.

(Direct heredity, 5 families; 5 mothers affected; 38 children; 13 affected, 25 not, 1 unknown—disregarded.)

XXX. Fromaget. (126)

I. a male, cong. lamellar cataract, 4 children.
b male, cong. lamellar cataract, no children.
II. a female, cong. lamellar cataract, no children.
b, c females, cong. lamellar cataract, no children.
d female, cong. lamellar cataract, 3 children.
III. a male, cong. lamellar cataract, no children.
b female, cong. lamellar cataract, 6 children.
c (?), normal.
IV.
2 males and 1 female, cong. lamellar cataract.
3 (?), normal.

(Direct heredity, 3 families; 1 father and 2 mothers affected; 13 children; 9 affected, 4 not. Collateral heredity, 1 family; 2 children; both affected.)

XXXI. Fukala. (131)
  I. female, cataract, 13 children.
  II. a female, cataract, 5 children.
    b female, cataract, 10 children.
    c female, cataract, 5 children.
    d male, cataract, 4 children.
    e male, cataract, 4 children.
    4 (?), cataract, no children.
    4 (?), normal, no children.
  III.
  Children IIa.
    3 (?), cataract.
    2 (?), normal.
  Children IIb.
    2 (?), cataract.
    8 (?), normal.
  Children IIc.
    3 (?), cataract.
    2 (?), normal.
  Children IId.
    1 (?), cataract.
    3 (?), normal.
  Children IIc.
    1 (?), cataract.
    3 (?), normal.

(Direct heredity, 6 families; 4 mothers and 2 fathers affected; 41 children; 19 affected, 22 not.)

(B) Patient, her brother and sister and an aunt had cataract.

(Indirect heredity, 1 family; 3 children; all affected.)

XXXII. Galezowski. (134)
  Cataract in 4 generations.
  (Not statistically available.)

XXXIII. Galezowski. (135)
  I. female, cataract, 1 child.
  II. female, cataract, 2 children.
  III. a female, cataract, 3 children.
    b female, cataract, 2 children.
  IV.
  Children IIIa.
    a, b females, cataract.

c male, normal.

Children IIIb.

d female, cataract.

e male, normal.

(Direct heredity, 4 families; 4 mothers affected; 8 children; 6 affected, 2 not.)

XXXIV. Gerok. (137)

(A) 5 persons in 3 branches of a family had congenital cataract.

(Not statistically available.)

(B) Father and 2 children cataract.

(Direct heredity, 1 family; father and 2 children affected.)

(C) 2 brothers congenital cataract.

(Collateral heredity, 1 family; 2 children, both affected.)

(D) Father and 2 children congenital cataract.

(Direct heredity, 1 family; father and 2 children affected.)

(E) 4 children congenital cataract, inherited through the father.

(Not statistically available, as the source of the taint is not stated.)

(F) Grandfather, uncle, father and patient had cataract.

(Direct heredity, 2 families; 2 fathers affected; 3 children, all affected.)

(G) Mother and 2 children cataract.

(Direct heredity, 1 family; mother and 2 childern affected.)

In 49 cases each, the father or mother was affected at the same time as the child. In 138 cases, either a brother or a sister was affected. 4 times, the patient said he came from a cataractous family. In 22 cases several children were affected; and 36 times, 2 or more branches of the same family tree were affected. In all, heredity was found in senile cataract in 4.9% of cases; in juvenile and congenital 14.2%, and in congenital alone, in 16.4%.

XXXV. Geviot. (139)

Mother and son bilateral congenital cataract.

(Direct heredity, 1 family; mother and 2 children affected.)

XXXVI. Gjersing.
I. female, cataract, 2 children.
II. a female, cataract, 4 children.
b female, cataract, 1 child.
III.
Children IIa.
a male, cataract, 2 children.
b female, normal, 2 children.
c female, cataract, 2 children.
d female, cataract, 7 children.
Children IIb.
e female, cataract, 2 children.
IV.
Children IIIa.
a female, cataract, 3 children.
b female, cataract, no children.
Children IIIb.
c, d females, normal.
Children IIIc.
e, f males, cataract.
Children IIId.
4 males and 3 females cataract.
Children IIIe.
1 male, normal.
1 female, cataract.
V.
Children IVa.
1 female, cataract.
2 males, normal.
(Direct heredity, 8 families; 7 mothers and 1 father affected; 23 children; 19 cataractous, 4 not.)

XXXVII. Green. (154)
I. female, cataract, 2 children.
II. a female, cataract, 3 children.
b female, cataract, 12 children.
III.
Children IIa.
a, b, c females, cataract, no children.
Children IIb.
d male, cataract, no children.
e, f males, normal, no children.

g, h males, normal, no children.
i female, cataract, 9 children.
6 females, normal, no children.

IV.

Children IIIi.
- a, c, males, normal, 6 children.
- b female, cataract, 3 children.
- d male, normal, 4 children.
- e male, cataract, 8 children.
- f male, cataract, 2 children.
- g female, cataract, no children.
- h male, cataract, 8 children.
- i female, normal, 1 child.

V.

Children IVa and IVc.
- a, b, c, d, e, f (?), all normal.

Children IVb.
- g female, cataract, 2 children.
- h male, cataract, 3 children.
- i female, cataract, 1 child.

Children IVd.
- j female, cataract, no children.
- k, l, m (?), normal, no children.

Children IVe.
- n female, normal, 1 child.
- o, p, q, r, s, t, u all normal.

Children IVf.
- v female, cataract.
- w (?), normal.

Children IVh.
- x female, cataract.
- 7 (?), normal.

Children IVi.
- 1 (?), normal.

VI.

Children Vg.
- a male, cataract.
- b (?), normal.

Children Vh.
- c, d, e (?), normal.

Children Vn.
- f male, cataract.

Children Vh.
1 female, cataract.

(Direct heredity, 11 families; 7 mothers and 4 fathers affected; 53 children, 19 affected, 34 not. Indirect heredity, 2 families; 5 children; 2 affected, 3 not.)

XXXVIII. Groenouw. (155)

Father zonular cataract; 2 out of 7 children also had same.

(Direct heredity, 1 family; father affected; 7 children; 2 affected, 5 not.)

XXXIX. Guiot. (157)

Mother bilateral zonular cataract; son incomplete bilat. cataract.

(Direct heredity, 1 family; mother and son affected.)

XL. Gunn. (158)

(A) I. female, cataract, 7 children.
II. a male, cataract, 3 children.
3 male, cataract, no children.
3 (?), normal.
III. a female, normal.
b female, cataract.
c male, normal.

(Direct heredity, 2 families; 1 father and 1 mother affected; 10 children; 5 affected, 5 not.)

(B) Mother and daughter congenital cataract.

(Direct heredity, 1 family; mother and 1 child affected.)

(C) 2 sisters cataract; 1 brother normal.

(Collateral heredity, 1 family; 3 children; 2 affected, 1 not.)

XLI. Hall. (165)

Father complete bilateral cataract; 3 sons anterior polar cataract.

(Direct heredity, 1 family; father and 3 children affected.)

XLII. Hansell. (167)

I. male, (?), 10 children.
II. female, cataract, 6 children.
III. a female, cataract, 3 children.

b female, cataract.
c male, cataract.
3 (?), normal.
IV. 1 male, cataract.
2 (?), normal.

(Direct heredity, 2 families; 2 mothers affected; 9 children; 4 affected, 5 not.)

XLIII. Hirschberg. (182)

I. male, cataract, 4 children.
II. a female, cataract, no children.
b female, normal, 5 children.
c male, cataract, no children.
d female, cataract, 1 child.
III.
Children IIb.
5 (?), normal.
Children IIc.
1 female, cataract.

(Direct heredity, 2 families; 1 father and 1 mother affected; 5 children; 4 affected, 1 not.)

XLV. Hirschberg. (183)

(A) 2 generations with premature cataract; 3rd generation, a child with lamellar cataract.

(Not statistically available.)

(B) Mother congenital cataract; child lamellar cataract.

(Direct heredity, 1 family; mother and 1 child affected.)

(C) Father cataract; 1 brother lamellar cataract; 1 son congenital cataract.)

(Collateral heredity, 1 family; 2 children, both affected. Direct heredity, 1 family; father and 1 child affected.)

XLVI. Hirschberg. (184)

Grandmother, mother and 2 children had bilateral cataract.

(Direct heredity, 2 families; 2 mothers affected; 3 children, all affected.)

XLVII. Hirschberg. (185)

(A) 2 children cataract.

(Collateral heredity, 1 family; 2 children, both affected.)

(B) 2 children microphthalmus and cataract..

(Collateral heredity, 1 family; 2 children, both affected.)

(C) Father and 3 out of 4 children affected with cataract.

(Direct heredity, 1 family; father affected; 4 children; 3 affected, 1 not.)

XLVIII. Horwitz. (192)

I. female, cataract, 4 children.
II. a female, normal, 1 child.
  b female, cataract, 2 children.
  c male, cataract, 4 children.
  d female, normal, 1 child.
III.
Children IIa.
  a (?), normal.
Children IIb.
  b, c females, cataract.
Children IIc.
  4 (?), normal.

(Direct heredity, 3 families; 2 mothers and 1 father affected; 10 children; 4 affected, 6 not.)

XLIX. Hosch. (193)

Grandfather, father and 3 daughters had lamellar cataract; 7 children normal.

(Direct heredity, 2 families; 2 fathers affected; 11 children; 4 affected, 7 not.)

L. Hunter. (195)

I. male albino, married female with cataract; 6 children.
II. a male, cataract, 3 children.
  b male, cataract, 3 children.
  c, d males, cataract, no children.
  e female, cataract, 3 children.
  f female, normal, 1 child.
III.
Children IIa.
  2 females, cataract.
  1 male, normal.

Children IIb.
3 females, normal.
Children IIe.
1 male, cataract.
2 females, normal.
Children IIf.
1 male, normal.

(Direct heredity, 4 families; 2 mothers and 2 fathers affected; 15 children; 8 affected, 7 not.)

LI. Jeaffreson (203)

Claims that inheritance of cataract, even senile, has been clearly demonstrated. The latter frequently occurred before the 30th year. Reports the following cases

(A) Mother, age 70, cataract; 1 daughter, age 39, and another, age 42, also had cataract.

(Direct heredity, 1 family; mother and 2 children affected.)

(B) Father, 2 sons, and paternal uncle senile cataract.

(Direct heredity, 1 family; father and 2 children affected. Collateral heredity, 1 family; 2 children, both affected.)

LII. Klamroth. (216)

5 brothers and sisters cataract.

(Collateral heredity, 1 family; 5 children, all affected.)

LIII. Klamroth. (217).

Father and 2, twin, daughters cataract.

(Direct heredity, 1 family; father and 2 children affected.)

LIV. Knape. (219)

Father aniridia, opacities lens; son aniridia and cataract.

(Direct heredity, 1 family; father and 1 child affected.)

LV. Kniess. (220)

I. male, cataract, 1 child.
II. female, cataract, 6 children.
III. 3 males, cataract.
1 female, cataract.
2 females, normal.

(Direct heredity, 2 families; 1 father and 1 mother affected; 7 children; 5 affected, 2 not.)

LVI. Kraisky. (224)

Grandmother, mother and 2 sons congenital cataract. Other children normal.

(Direct heredity, 1 family; mother and 1 child affected. The III generation is not statistically available, as the number of normal children is not given.)

LVII. Kunn. (226)

I. female, cataract, 1 child.
II. female, cataract, 4 children.
III. 2 males, cataract.
2 males, normal.

(Direct heredity, 2 families; 2 mothers affected; 5 children; 3 affected, 2 not.)

LVIII. Laskiewicz-Friedenfeld. (236)

Grandfather, father, and 2 children cataract and aniridia.

(Direct heredity, 2 families; 2 fathers affected; 3 children, all affected.)

LIX. Lusardi. (257)

(A) Grandson, mother, aunt, uncle and grandmother cataract.

(B) 6 children out of 14 had cataract.

(C) Father and 5 children cataract.

(Direct heredity, 3 families; 2 mothers and 1 father affected; 9 children; all affected. Collateral heredity, 1 family; 14 children; 6 affected, 8 not.)

LX. Magnus. (275)

Father, daughter and 2 sons congenital cataract.

(Direct heredity, 1 family; father and 3 children affected.)

LXI. Maitre Jean. (227)

2 brothers and 1 sister cataract.

(Collateral heredity, 1 family; 3 children; all affected.)

LXII. Manz. (279)

Father bilateral irideremia congenita and cataract; son same, also nystagmus.

(Direct heredity, 1 family; father and 1 child affected.)

LXIII. Maunoir. (285)

I. male, cataract, 4 children.
II. a male, cataract, 2 children.
  b. c females, cataract, no children.
  d male, normal, 7 children.
III.
Children IIa.
  a, b (?), cataract.
Children IId.
  6 females, normal.
  1 female, cataract, 4 children.
IV.
  1 (?), cataract.
  3 (?), normal.

(Direct heredity, 3 families; 2 fathers and 1 mother affected; 10 children; 6 affected, 4 not. Indirect heredity, 1 family; 7 children; 1 affected, 6 not.)

LXIV. Miles. (289)

Mother, 1 son and 3 daughters congenital cataract; 2 children normal.

(Direct heredity, 1 family; mother affected; 6 children; 4 affected, 2 not.)

LXV. Milliken. (290)

(A) Grandmother, mother, son and daughter juvenile cataract.

(B) 2 daughters, mother, aunt and grandmother congenital cataract.

(C) Father, 3 daughters and 1 son bilateral cataract; 3 sons normal.

(Direct heredity, 5 families; 4 mothers and 1 father affected; 14 children; 11 affected, 3 not.)

LXVI. Müller. (303)

Mother and 3 children cataract; 2 children normal.

(Direct heredity, 1 family; mother affected; 5 children; 3 affected, 2 not.)

LXVII. Nettleship. (311)

(1) I. male, cataract, 1 child.
II. male, cataract, married a woman who also had cataract, 8 children.

III. 2 males, cataract.
6 (?), normal.

(Direct heredity, 1 family; father and 1 child affected. Direct heredity, 1 family; father and mother both affected; 8 children; 2 affected, 6 not.)

(2) I. male, cataract, 3 children.
II. a, b male, cataract, no children.
c female, cataract, 2 children.
III. 2 males, cataract.

.(Direct heredity, 2 families; 1 father and 1 mother affected; 5 children; all affected.)

(4) Father, age 60, and son, age 47, cataract.
(5) Father, age, 68, and 2 sons, ages, 49, 35, cataract. 6 others normal.
(6) Father, age 50, and son, age 40, cataract.
(7) Father, son and 2 daughters, cataract.
(8) Father and son, cataract.
(9) Mother and daughter, cataract.
(10) Father and daughter, cataract.
(11) Mother and daughter, cataract.
(12) Mother and daughter, cataract.
(13) Mother and son, cataract.

(Direct heredity, cases 4-13 inclusive, 10 families; 6 fathers and 4 mothers affected; 19 children; 13 affected, 6 not.)

(14) I. a female, cataract, 3 children.
b male, cataract, no children.
c male, cataract, no children.
II. 3 females, cataract.

(Direct heredity, 1 family; mother and 3 children affected. Collateral heredity, 1 family; 3 children, all affected.

(17) I. (?), normal, 8 children.
II. a female, cataract, 8 children.
b female, cataract, 5 children.
c female, cataract, no children.
d female, normal, 13 children.
e male, cataract, 4 children.
f female, normal, 8 children.
g, h females, cataract, no children.

III.

Children IIa.
  1 female, cataract,
  7 (?), normal.

Children IIb.
  1 male, cataract.
  4 (?), normal.

Children IId and IIf.
  all normal.

Children IIe.
  1 female, cataract.
  3 males, normal.

(Collateral heredity, 1 family; 8 children; 6 affected, 2 not. Direct heredity, 3 families; 2 mothers and 1 father affected; 17 children; 3 affected, 14 not.)

(18) I. male, cataract, 12 children.
II. a, b (?), (?).
  c female, normal, 3 children.
  d male, cataract, 4 children.
  e female, cataract. 4 children.
  f female, cataract, 7 children.
  6 (?). normal, no children.

III.

Children IIc
  a female, normal, 5 children.
  b, e (?), normal, no children.

Children IId, by his first wife.
  d male, normal, no children.
  By his second wife.
  e female, normal, 3 children.
  f male, normal, no children.
  g male, cataract, no children.

Children IIe.
  h female, normal, 2 children.
  i female, cataract, 4 children.
  j female, normal, no children.
  k male, normal, 5 children.

Children IIf.
  l female, cataract, no children.
  m male, normal, 2 children.
  n male, normal, no children.

e female, normal, 3 children.
3 (?), normal, no children.
IV. all normal so far.

(Direct heredity, 5 families; 2 fathers and 3 mothers affected; 31 children; 6 affected, 25 not.)

(18a) I. male, cataract, 1 child.
II. male, cataract, 1 child.
III. male, normal, 2 children.
IV. a male, normal, no children.
b male, cataract, 4 children.
V. a male, cataract, 2 children.
b male, cataract, 3 children.
c male, cataract, 6 children.
d female, normal, no children.
VI.
Children Va.
a male, cataract, 5 children.
b (?), (?)
Children Vb.
c, d, e (?), normal.
Children Vc.
6 (?), normal.
VII.
Children VIa.
5 (?), normal.

(Direct heredity, 7 families; 7 fathers affected; 22 children; 5 affected, 17 not. Indirect heredity, 1 family; 2 children; 1 affected, 1 not.)

(20) I. female, cataract, 1 child.
II. female, cataract, 1 child.
III. female, cataract, 1 child.
IV. female, cataract, no children.

(Direct heredity, 3 families; 3 mothers affected; 3 children; all affected.)

(19) I. (?), normal, 2 children.
II. a female, cataract, 4 children.
b female, cataract, 3 children.
III.
Children IIa.
a female, cataract, 6 children.
b female, cataract, no children.

c female, normal, no children.
d female, normal, 5 children.
Children IIb.
e female, cataract, no children.
f male, normal, no children.
g male, cataract, 1 child.
IV.
Children IIIa.
a female, normal, no children.
b female, cataract, 3 children.
c, d males, cataract, no children.
e female, cataract, 2 children.
f male, cataract, 6 children.
Children IIIc and IIId.
all normal.
Children IIIg.
1 female, cataract, no children.
V.
Children IVb.
a male, cataract.
b female, cataract.
c female, normal.
Children IVe and IVf.
all normal.

(Collateral heredity, 1 family; 2 children, both affected. Direct heredity, 7 families; 1 father and 6 mothers affected; 25 children; 12 affected, 13 not.)

(21) Mother and daughter cataract.
(22) Mother and son cataract.
(23) Mother and son cataract.
(24) Mother and daughter cataract.
(25) Mother and son cataract.
(29) Father and son cataract; 3 children normal.

(Direct heredity, 6 families; 5 mothers and 1 father affected; 9 children; 6 affected, 3 not.)

(30) I. (?), (?), 2 children.
II. a female, normal, 4 children.
b female, cataract, no children.
III. 2 females, cataract.
2 (?), normal,.

(Indirect heredity, 1 family; 4 children; 2 affected, 2 not.)

(31) Daughter, mother and maternal aunt cataract.

(Direct heredity, 1 family; mother and 1 child affected. Collateral heredity, 1 family; 2 children; both affected.)

(32) Grandfather and granddaughter cataract.

(Direct heredity, 1 family; father affected; 1 child, not affected. Indirect heredity, 1 family; 1 child affected.)

(33) I. male, cataract, 7 children.
  II. a female, cataract, 5 children.
    b, c females, cataract, no children.
    d male, cataract, no children.
    3 females, normal, no children.
  III. a (?), cataract.
    4 (?), normal.

(Direct heredity, 2 families; 1 father and 1 mother affected; 12 children; 5 affected, 7 not.)

(56) 2 children cataract, 4 normal.

(57) 2 children cataract, 7 normal.

(Collateral heredity, 2 families; 15 children; 4 affected, 11 not.)

(58) I. male, cataract, 8 children.
  II. a male, cataract, no children.
    b male, cataract, 5 children.
    c, d males, cataract, no children.
    e female, cataract, no children.
    f female, normal, 3 children.
    g female, normal, 21 children.
    h female, cataract, 6 children.
  III.
  Children IIb.
    a male, cataract, 2 children.
    b male, cataract, 7 children.
    c female, cataract, no children.
    d female, normal, 2 children.
    e female, normal, 1 child.
  Children IIf.
    f, g males, normal, no children.
    h female, normal, 2 children.
  Children IIg.
    all normal.

Children IIh.
- i (?), normal, 1 child.
- j female, cataract, no children.
- k female, cataract, 11 children.
- 3 (?), normal.

IV.

Children IIIa.
- a female, normal, 3 children.
- b female, cataract, 3 children.

Children IIIb.
- c male, cataract, 3 children.
- d, e, f males, cataract, no children.
- g female, normal, no children.
- h male, normal, no children.
- i (?), normal, no children.

Children IIId.
- j male, normal, no children.
- k female, normal, no children.

Children IIIe.
- l (?), normal, no children.

Children IIIh.
- m, n males, normal, no children.

Children IIIi.
- o (?), normal, no children.

Children IIIk.
- p female, normal, 1 child.
- q female, normal, no children.
- r male, cataract, no children.
- s female, normal, 3 children.
- t (?), normal, no children.
- u male, cataract, 4 children.
- v, w males, cataract, no children.
- x female, cataract, 2 children.
- y, z females, cataract, no children.

V.

Children IVa.
- all normal.

Children IVb.
- 2 (?), cataract.
- 1 (?), normal.

Children IVc.
- all normal.

Children IVk.
  1 (?), normal.
Children IVp.
  1 (?), normal.
Children IVs.
  3 (?), normal.
Children IVu.
  2 cataract.
  2 normal.
Children IVx.
  1 cataract.
  1 normal.

(Direct heredity, 11 families; 6 fathers and 5 mothers affected; 51 children; 28 affected, 23 not.)

(58a) Mother and 2 children cataract; 5 children normal.

(Direct heredity; 1 family; mother affected; 7 children; 2 affected, 5 not.)

(58b) I. female, cataract, 1 child.
II. female, cataract, (?) child.
III. 5 children, cataract; others unknown.

(Direct heredity, 1 family; mother and 1 child affected. III generation not statistically available.)

(59) 2 sisters cataract.
(71) 2 sisters cataract, 4 children normal.
(72) 2 children cataract, 5 children normal.
(73) 4 children cataract.
(75) 3 children cataract.

(Collateral heredity, 5 families; 22 children; 13 affected, 9 not.)

(74) Mother and 2 sons cataract.
(79) Mother and son cataract.

(Direct heredity, 2 families; 2 mothers and 3 children affected.)

(76) I. female, cataract, 1 child.
II. male, cataract, 2 children.
III. a female, cataract, 1 child.
b female, cataract, no children.
IV. female, cataract, no children.

(Direct heredity, 3 families; 1 father and 2 mothers affected; 4 children, all affected.)

LXVIII. Nettleship. (312)

(99) Great-grandfather, grandmother, father and son cataract.

(107) Father and 2 sons juvenile cataract; 1 daughter, sight good.

(Direct heredity, 4 families; 3 fathers and 1 mother affected; 6 children; 5 affected, 1 not.)

(100) 3 children cataract; 3 normal.

(Collateral heredity; 1 family; 6 children; 3 affected, 3 not.)

(108) I. male, cataract, 7 children.
  II. a male, cataract, 2 children.
    b female, cataract, 12 children.
    c female, cataract, 1 child.
    f female, normal, 1 child.
    e male, normal, 1 child.
    f, g females, normal, no children.
  III.
  Children IIa.
    2 (?), normal.
  Children IIb.
    2 males, cataract.
    3 females, cataract.
    7 (?), (?), died young, not counted.
  Children IIc, IId, IIe, all normal.

(Direct heredity, 4 families; 2 fathers and 2 mothers affected; 15 children, 8 cataract, 7 not.)

LXIX. Nettleship. (314)

(14) Mother and daughter cataract; mother also has retinitis pigmentosa.

(Direct heredity, 1 family; mother and 1 child affected.)

LXX. Neuffer. (315)

(6) Brother and sister cataract.

(Collateral heredity, 1 family; 2 children, both affected.)

(27) 2 children congenital cataract; 1 retinitis pigmentosa; 8 normal.

(Collateral heredity, 1 family; 11 children; 2 affected, 9 not.)

SERIES II.

(7) Mother retinitis pigmentosa and lamellar cataract; 1 daughter congenital cataract and nystagmus; 5 children normal.

(Direct heredity, 1 family; mother affected; 6 children; 1 affected, 5 not.)

LXXI. Nolte. (319)

(1) 2 brothers and 1 sister cataract.

(Collateral heredity, 1 family; 3 children, all affected.)

(2) I. (?), normal, 2 children.
II. a female, cataract, 7 children.
b male, cataract, 5 children.
III.
Children IIa.
7 (?), normal.
Children IIb.
1 male, cataract.
1 female, cataract.
3 (?), normal.

(Collateral heredity, 1 family; 2 children, both affected. Direct heredity, 2 families; 1 father and 1 mother; 12 children; 2 affected, 10 not.)

(3) Mother and 3 children cataract; 2 children normal.

(Direct heredity, 1 family; mother affected; 5 children; 3 affected, 2 not.)

LXXII. Paly. (329)

(1) Father and child cataract.
(2) Father and child cataract.
(3) 2 children cataract.
(4) 2 sisters cataract.
(5) Brother and sister cataract.

(Direct heredity, 2 families; 2 fathers and 2 children affected. Collateral heredity, 3 families; 6 children, all cataract.)

LXXIII. Parsons. (333)

Grandmother, mother and 2 daughters congenital punctate cataract; male members of the family not affected.

(Not statistically available.)

LXXIV. Petit. (337)

All of the members of a certain family became cataractous at the age of 30.

(Not statistically available.)

LXXV. Pisentie. (344)

2 sons hydrocephalus, congenital cataract, nystagmus; 1 daughter convergent strabismus; 1 daughter hydrocephalus, congenital cataract, nystagmus; 2 daughters normal eyes.

(Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

LXXVI. Purtscher. (353)

3 out of 11 children congenital cataract.

(Collateral heredity, 1 family; 11 children; 3 affected, 8 not.)

LXXVII. Rava. (357)

I. female, cataract, etc., 4 children.
II. a female, cataract, etc., no children.
 b female, cataract, etc., 2 children.
 2 (?), normal, no children.
III. a male, no cataract.
 b (?), no cataract.

(Direct heredity, 2 families; 2 mothers affected; 6 children; 2 affected, 4 not.)

LXXVIII. Rampoldi. (358)

Father, 1 son, 2 daughters cataract; 4 children normal.

(Direct heredity, 1 family; father affected; 7 children; 3 affected, 4 not.)

LXXIX. Ray. (366)

(A) I. normal, 2 children.
II. a male, cataract, 6 children.
 b male, cataract, 1 child.
III.
Children IIa.
 6 (?), cataract.
Children IIb.
 1 (?), cataract.

(Direct heredity, 2 families; 2 fathers affected; 7

children, all affected. Collateral heredity, 1 family; 2 children, both affected.)

(B) Mother and daughter senile cataract.

(Direct heredity, 1 family; mother and 1 child affected.)

LXXX. Robertson. (371)

Father and son cataract and microphthalmus.

(Direct heredity, 1 family; father and 1 child affected.)

LXXXI. Saunders. (385)

3 brothers and 1 sister lamellar cataract.

(Collateral heredity, 1 family; 4 children, all affected.)

LXXXII. Schanz (386)

Father and 3 children cataract; 3 others normal.

(Direct heredity, 1 family; father affected; 6 children; 3 affected, 3 not.)

LXXXIII. Schmidt. (393)

2 brothers cataract and retinitis pigmentosa.

(Collateral heredity; 1 family; 2 children, both affected.)

LXXXIV. Schnabel. (398)

(1) Mother double juvenile cataract; 2 children left juvenile cataract; 1 child double juvenile cataract.

(2) Father and 2 children double juvenile cataract.

(3) 3 children and 3 maternal uncles and aunts cataract.

(4) 3 children double nuclear cataract.

(5) 3 children double nuclear cataract.

(Direct heredity, 2 families; 1 father and 1 mother affected; 5 children, all affected. Indirect heredity, 1 family; 3 children, all affected. Collateral heredity, 3 families; 10 children; 9 affected, 1 not.)

LXXXV. Scimemi. (404)

Zonular cataract in 2 brothers.

(Collateral heredity, 1 family; 2 children, both affected.)

LXXXVI. Selz. (407)

Father cataract, etc.; 1 daughter cataract; 4 children not.

(Direct heredity, 1 family; father affected; 5 children, 1 affected, 4 not.)

LXXXVII. Sichel. (408)

(A) I. male, cataract, 2 children.
  II. a male, normal, 3 children.
    b female, cataract, no children.
  III. 3 (?), cataract.

(Direct heredity, 1 family; father affected; 2 children; 1 affected, 1 not. Indirect heredity, 1 family; 3 children, all affected.)

(B) Grandfather, father and 2 children cataract.

(C) Daughter, mother, maternal aunt and maternal grandmother cataract.

(Direct heredity, 4 families: 2 fathers and 2 mothers affected; 6 children, all affected.)

LXXXVIII. Stieren. (427)

I. (?), normal, 14 children.
II. a male, normal, 3 children.
  b male, normal, 8 children.
  c female, normal, 10 children.
  d female, normal, 8 children.
  e female, normal, 7 children.
  3 males, cataract, died in infancy.
  5 males, normal, died in infancy.
  1 male, normal, no children.
III.
Children IIa.
  a female, normal, 3 children.
  b female, normal, 9 children.
  c male, normal, died in infancy.
Children IIb. „
  d female, normal, 2 children.
  e-k (?), normal, no children.
Children IIc.
  l female, normal, 6 children.
  m male, normal, 1 child.
  n-p males, cataract, died in infancy.
  q-u (?), normal, 2 died below 12 years of age; [no children].

Children IId.
  v female, normal, 3 children.
  w female, normal, 1 child.
  x male, cataract, died in infancy.
 y-ac (?), normal, no children.
Children IIe
  ad female, normal, 2 children.
  ae male, cataract, died in infancy.
  af-aj (?), normal, no children.
IV.
Children IIIa.
  2 females, normal.
  1 male, cataract, died in infancy.
Children IIIb.
  8 (?) normal.
  1 male, cataract, died in infancy.
Children IIId.
  1 male, normal.
  1 male, cataract, died in infancy.
Children IIIl.
  2 males, normal.
  4 males, cataract, died below 2 years of age.
Children IIIm.
  1 male, normal.
Children IIIv.
  2 females, normal.
  1 male, cataract, died in infancy.
Children IIIw.
  1 male, normal.
Children IIIad.
  1 female, normal.
  1 male, cataract, died in infancy.

(Collateral heredity, 1 family; 14 children; 3 affected, 11 not. Indirect heredity, 9 families; 50 children; 14 affected, 36 not.)

LXXXIX. Stock. (430)
2 cases out of several in the same family.
(Not statistically available.)

XC. Storbeck. (432)
I. (?), normal, 2 children.

II. a male, normal, 1 child.
  b male, normal, 2 children.

III.

Children IIa.
  a male, normal, 4 children.

Children IIb.
  b male, normal, 6 children.
  c male, normal, 8 children.

IIIb and IIIc married sisters.

IV.

Children IIIa.
  2 females, cataract.
  2 females, normal.

Children IIIb.
  1 male, cataract.
  5 (?), normal.

Children IIIc.
  4 (?), cataract.
  4 (?), normal.

(Collateral heredity, 3 families; 18 children; 7 affected, 11 not.)

XCI. Streatfield. (436)

Mother and 5 out of 8 children cataract.

(Direct heredity, 1 family; mother affected; 8 children; 5 affected, 3 not.)

XCII. Streatfield. (438)

(A) 3 sisters congenital cataract.

(B) Father and son bilateral congenital cataract.

(Collateral heredity, 1 family; 3 children, all affected. Direct heredity, 1 family; father and 1 child affected.)

XCIII. Stricker. (441)

Grandmother, 57, mother, 48, daughter, 26, cataract.

(Direct heredity, 2 families; 2 mothers affected; 2 children, both affected.)

XCIV. Thompson. (450)

I. (?), normal, 5 children.

II. a female, cataract, 3 children.
  4 (?), normal, no children.

III. a male, cataract, 3 children.
  b male, cataract, 3 children.
  c female, normal, 12 children.
IV.
 Children IIIa.
  a male, cataract, no children.
  b female, cataract, no children.
  c (?), normal, no children.
 Children IIIb.
  d male, cataract, 5 children.
  e male, cataract, no children.
  f female, normal, 6 children.
 Children IIIc.
  12 (?), normal, no children.
V.
 Children IVd.
  3 females, cataract.
  1 male, cataract.
  1 male, normal.
 Children IVf.
  6 (?), normal.

(Direct heredity, 4 families; 1 mother and 3 fathers affected; 14 children; 10 affected, 4 not.)

XCV. Thye. (451)

Father and son premature cataract, etc.

(Direct heredity, 1 family; father and 1 child affected.)

XCVI. Trousseau. (456)

Of 20 cases of congenital cataract, 5 showed heredity, 3 showed consanguinity.

(Not statistically available.)

XCVII. Van der Berg. (458)

Mother and child bilateral congenital cataract.

(Direct heredity, 1 family; mother and 1 child affected.)

XCVIII. Walter. (469)

3 out of 12 children cataract.

(Collateral heredity, 1 family; 12 children; 3 affected, 9 not.)

XCIX. Webster. (471)

Mother and daughter bilateral congenital cataract.

(Direct heredity, 1 family; mother and 1 child affected.)

C. Westhoff. (475)

3 children congenital cataract; 5 unaffected.

(Collateral heredity, 1 family; 8 children; 3 affected, 5 not.)

CI. Williams. (483)

I. male, cataract, (?) children.
II. a male, cataract, 5 children.
b male, cataract, 7 children.
c male, cataract, no children.
d female, cataract, 2 children.
? (?), normal, no children.
III.
Children IIa
a male, cataract, 4 children.
1 (?), cataract, no children.
3 (?), normal, no children.
Children IIb.
3 (?), cataract.
4 (?), normal.
Children IId.
2 (?), cataract.
IV.
Children IIIa.
3 (?), cataract.
1 (?), normal.

(II generation cannot be used statistically. Direct heredity, 4 families; 3 fathers and 1 mother affected; 18 children; 10 affected, 8 not.)

CII. Wilson. (484)

In 4 generations, with 31 descendants, 16 had congenital cataract.

(Not statistically available.)

CIII. Wood. (487)

(S) I. female, cataract, 6 children.
II. a female, normal, 7 children.
5 (?), normal, no children.

III. a female, cataract, 12 children.
6 (?), normal, no children.
IV. 5 females, cataract.
5 males, cataract.
2 males, normal..

(Direct heredity, 2 families; 2 mothers affected; 18 children; 11 affected, 7 not. Indirect heredity, 1 family; 7 children; 1 affected, 6 not.)

(H) I. female, cataract, 6 children.
II. a male, cataract, 8 children.
b male, cataract, no children.
c female, cataract, 5 children.
d female, normal, 4 children.
e female, normal, no children.
f male, normal, no children.
III.
Children IIa.
4 males, cataract.
2 females, unknown (not counted).
2 (?), normal.
Children IIb.
2 (?), cataract.
3 (?), normal.
Children IId.
2 (?), cataract.
2 (?), normal.

(Direct heredity, 3 families; 2 mothers and 1 father affected; 17 children; 9 affected, 8 not. Indirect heredity, 1 family; 4 children, 2 affected, 2 not.)

(I. S.)
I. (?), normal, 6 children.
II. a male, cataract, no children.
b male, cataract, 4 children.
c male, cataract, 7 children.
3 (?), normal, (?) children.
III.
Children IIb.
1 female, cataract.
3 (?), normal.
Children IIc.
2 females, cataract.
5 (?), normal.

(Direct heredity, 2 families; 1 father and 1 mother affected; 11 children; 3 affected, 8 not. Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

CIV. Zirm. (495)

(1) Great-grandfather, grandfather, father, 2 sons, a paternal uncle and his 3 sons had cataract.

(Direct heredity, 4 families; 4 fathers and 8 children affected.)

(4) Mother and daughter cataract.

(5) Father and son cataract.

(Direct heredity, 2 families; 1 father and 1 mother affected; 2 children, both affected.)

(To be continued.)

ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

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Conjunctivitis Associated with Bacillus Pyocyaneus in an Adult. Bacillus Pyocyaneus Found in a Normal Conjunctival Sac.

PUSEY, BROWN, Chicago (*Archives of Ophthalmology,* November, 1908), reports two cases and finds upon consulting the literature that of the cases of conjunctivitis recorded as due to the bacillus pyocyaneus all of them, there are only five, were in new-born children. Case I. was in a man twenty-five years of age, who had suffered with irritable and red eyes for several months; there was hardly any discharge from the eyes. Case II. was in a man twenty-five years of age, who had been suffering from headaches, with a history of itching and burning, but no further evidence of conjunctivitis. Both cases recovered after the use of zinc-sulphate, one-fourth per cent solution, applied four or five times daily. H. G. C

Primary Epibulbar Melano-Sarcoma.

GROSS, JULIUS, St. Louis, Mo. (*Ophthalmic Record*, October, 1908), reports a case of primary epibulbar melano-sarcoma in a woman 21 years old. In the horizontal meridian of the right eye there was a shining black growth, which measured 2 mm. in the vertical, 1:5 mm. in the horizontal meridian, and rose above the level of the globe about 1:5 mm. The growth rose abruptly at the corneal side anl descended gradually to the conjunctival end. The base was constricted and the edges protruded over the base. It was immovably attached to the corneal limbus.

With the advice and under the direction of Dr. A. E. Ewing, the tumor was removed by being grasped firmly with a forceps and trimmed off from the cornea with a broad double-edged, round-pointed knife, having its cutting edge at the end; it was cut from the sclera in the same manner. The wound was then carefully curetted with the knife, and a small suture placed in the conjunctiva. The wound healed well, and vision is now as good as before the operation.

The tumor is covered by epithelium, which does not dip into the growth. There are three well-defined pigmented areas of dark brown color having many cells of medium size, containing pigments; pigment is also found in the cellular substance. Surrounding these areas are many smaller cells which make up the greater part of the tumor. The pigmented cells are chromatophores, as are also the smaller ones which have not developed pigment. O. W.

Contusion of the Eyeball, with Special Reference to Traumatic Aniridia.

FEJER, JULIUS, Budapest (*Archives of Ophthalmology*, September, 1908), reports a case in which the iris and lens were torn away without extrusion from the eye through a rupture of the sclera. They became absorbed and left no traces and the patient obtained satisfactory vision with a correcting glass.

The patient consulted another ophthalmologist on the second day after the receipt of the injury and came to the writer on the eighth day, but no trace of scleral wound was found by either of them. The author asks what became of the iris and of the lens, for as the sclera did not rupture they could not escape the eye. He believes they were both absorbed, because in this case a fluttering membrane with ragged edges was seen to gradually undergo absorbtion until only a trace of pigment remained. Later, a gray body was seen in the depths of the eye, which was probably the capsule, the lens having undergone the same process. The eyeball retained its normal form. H. G. G.

The Treatment of Immature Cataract.

Smith, Major Henry, Indian Medical Service (*Archives of Ophthalmology,* November, 1908), after discussing the various ripening procedures, points out that they are either dangerous or disappointing, and while condemning them, he realizes the demand which has caused their initiation, the demand for some procedure by which men of active mental and bodily habits can be relieved of their condition without remaining practically blind for the years through which Nature's process would run, before they could be operated on by the capsulotomy method. The treatment advocated by the writer, and practiced by him, is extraction of the lens in its capsule, which he performs at a time when the condition of the lens unfits its possessor for the performance of his ordinary duties. The operation is performed in the following manner: The corneo-scleral incision is made with the speculum in, preferably without a conjunctival flap, the speculum is removed, the assistant draws down the lower eye-lid with the face of his thumb. With the other hand he lifts the upper lid forward with a large sized strabismus hook, lifting outwards and not upwards. The operator places the end of a large sized spatula on the left side of the cornea over the junction of the middle and lower third of the lens. He places the end of a large sized blunt pointed strabismus hook over the corresponding position to the right of the spatula. He makes steady pressure backwards towards the optic nerve with this spatula and makes similar pressure with the strabismus hook, drawing it backwards and forwards across the cornea. As soon as clear vitreous is seen from the tilting of the lens, the pressure with the spatula should practically cease and the same stroking movement of the strabismus hook should be continued, its position on the cornea not being altered on the cornea at first, but the direction of the pressure exerted through it should be changed gradually more and more in the direction of the wound until it finally folds the cornea beneath the lens. At this stage the lens is delivered, the assistant lets go the eye-lids, and the patient should be dressed. The writer states that his experience extends to about 20.000 cataract extractions, about 17,000 of which have been in the capsule, and amongst the latter have been many immature cataracts, especially in recent years.

H. G. G.

Further Experience with the Smith-Indian Operation in the Extraction of Fifteen Cataracts.

Greene, D. W., Dayton, Ohio (*Ophthalmic Recorl*, October, 1908), says that Major Smith has extracted 20,000 cataracts in 18 years, 17,000 of them within the capsule, 5,000 without iridectomy, and the balance with iridectomy; and with this experience is today the steadfast advocate of extraction within the capsule, that he asserts that the loss of the vitreous is not harmful, and that it is reproduced when lost. The writer also says that he, himself, has never seen harm result from the loss of vitreous. While it is admitted that there is probably 25 per cent more risk of the loss of vitreous by the Smith method, for the novice in any case, the method is superior to any process of artificial ripening and extraction afterward.

For quick delivery of the lens in emergencies, Major Smith has devised an instrument similar to the Daviel spoon, but flatter and more curved. This instrument has been modified by the writer with the approval of Major Smith. It can be held in the left hand and used to aid in the expression of the lens, and in the loss of the vitreous it can be passed well back of the lens to support it.

Major Smith has demonstrated that the pressure used in expressing the lens is not such as would be estimated by an onlooker; but he insists that the eye must look straight forward; that the pressure must be in the half circle around the lower half of the cornea about 2 mm. from its scleral border, and be backward, steady, uninterrupted and varied to the changing position of the lens in its exit; and that a strabismus hook must never be used to make traction on the lens up towards the incision. O. W.

Cyanosis Retinae.

TYSON, DR. HENRY H., New York (*Archives of Ophthalmology*, September, 1908), after describing in detail the history of a case, goes on to say that there was injection of the ocular conjunctiva, due to the dilatation of the vessels, which also encroached on the periphery of the cornea, the sensibility of which was diminished. The color fields were markedly contracted, the vision 20/20, exophoria 6° for distance, 12° for near, the fundus was much darker than normal, with a violet tinge, the disc appeared red, due to dilatation of capillaries upon its surface, the veins blue black, and the arteries of the usual color of veins, both being dilated and tortuous and extending to the periphery. As his case had a polycythaemia of 8,080,000, he believes that the prognosis is unfavorable. H. G. G.

Pigmentation of the Retina From the Vitreous Chamber. Typical Retinitis Pigmentosa.

KNAPE, ERNST V., Finland (*Archives of Ophthalmology*, September, 1908), reports the case of an elderly man, myopic, who had suffered from a detachment of the retina, which by degrees had become total. After this condition had persisted for some years, inflammatory symptoms manifested themselves. The most noteworthy point was that fine pigmentations became visible with the ophthalmoscope on the detached retina. After a chronic irido-cyclitis the eye was enucleated. Examination with a binocular loupe of the interior of the eye showed dark round spots and branching slender lines on the retina. The chorioid was pale, poor in pigment except at the place where it was attached to the retina. At that point it was densely pigmented. Microscopically the specimen showed the same characteristics, except that it was evident that the dark places were formed by free pigment granules and pigmented spots. After describing the microscopy in detail and considering the etiology of typical retinitis pigmentosa he briefly summarizes his theory as follows: The cause of retinitis pigmentosa is two-fold: a predisposition on the part of the chorioidal vessels to endarteritis obliterans, due to a congenital anomaly, and an excitant in the form of some disease of the eye, a fever, or syphilis. The nature of the disease is a gradually progressive endarteritis obliterans which begins in the smallest capillaries of the chorioid behind the ciliary body. As a consequence of altered nutritive conditions, this process produces an atrophy of the retina which slowly proceeds from the periphery toward the center, together with a secondary migration of pigment into the retina. He suggests that it would be particularly interesting to determine whether the patients are affected with endarteritis of other parts besides the chorioid. H. G. G.

Bilateral Glioma of the Retina with Numerous Distant Metastases.

GARDINER, JOHN PATTERSON (*Archives of Ophthalmology,* November, 1908), reports the case of a child four years of age, with the usual clinical history: When a few months old the parents noticed a peculiar yellow reflex in the right eye. At the age of three and one-half years the eye was enucleated and a diagnosis of glioma made. Three months later there was a recurrence in the right orbit and an involvement of the remaining eye. Several months later death took place and a post-mortem examination was made. Above the left zygomatic arch, in the region of the pterion, was a tumor the size of a goose egg, extending upward under the hair; on the right side was a similar tumor, a trifle smaller, while over the scalp several growths were palpable. The skull was remarkably altered in shape, and was found, upon removal of the calvarium, to be invaded by the growth. Nodules were seen in both pleural cavities, the periosteum of the vertebrae was affected, the lymph glands of the neck, the tracheo-bronchial, the supra and infra-clavicular glands were all involved. Included in the growth was also the right testicle, the periosteum of the iliac bones and the bodies of both ischia were enlarged, as well as the long bones of the leg and the sternum. Microscopic examinations were made of the growths from the sternum, the right temple, the right iliac bone, the dura, the posterior nares, the lymph glands in the right side of the neck, the medulla and periosteum of the femur, of the recurrent growths in the eyes and around the left optic nerve, and of the epidural and testicular tumors. A detailed examination of the eyes revealed typical glioma,.in all the other sections from growths outside of the eye, the tumor proper consisted of minute round cells sparsely endowed with cytoplasm, with nuclei varying considerably in size, but generally equal to, or smaller than, the nuclei of lymphocytes. In some of the cells the nuclei had the chromatin in such irregular masses that their appearance strongly suggested pyknosis. In the secondary growths there was none of the palisade arrangement about the vessels, the so-called perivascular cell mantles; in other words, the malignancy of the process as it is illustrated by structure, was marked by an absence in nearly all the secondary tumors of any structure resembling that of the primary tumor. The absence of orderly growth, and the appearances caused by it, present in nearly all the secondary tumors, was such as might be met with in round-cell sarcomas originating almost anywhere in the body. H. G. G.

The Relation Between Retinal Hemorrhages and High Arterial Pressure.

Fox, L. Webster, Philadelphia, Pa. (*Ophthalmic Record,* October, 1908), says that the true or exciting cause of a very large number of retinal hemorrhages is a sudden transient, or a persistent, abnormal elevation of the arterial blood pressure. He gives a tabulated report of the investigation of the blood pressure, blood and urine of 100 cases taken from private and dispensary practice. The patients examined were seen within 48 hours after the hemorrhage. The blood pressure was estimated with the Stanton modification of the Riva-Rocci sphygmomanometer with a 9 cm. cuff. This investigation was made in order to prove that the systematic estimation of the arterial blood pressure has an etiological and therapeutic relation to hemorrhages of the conjunctiva and retina. Forty per cent of retinal hemorrhages were in chronic interstitial nephritis; twenty-seven per cent in arterio sclerosis, and thirteen per cent in chronic parenchymatous. The writer here remarks that attention should be directed first to diseases of the kidneys, and secondly to diseases of the arteries, for the cause of retinal apoplexy. Six per cent of the cases were anaemic and four per cent lithaemic.

In the opinion of the writer, arterial blood pressure is an important factor in the causation of acute glaucoma; and he says that in a case of acute glaucoma, where the blood pressure was 265 cmm., twenty ounces of blood were taken from the right arm, after which the pressure fell to 150 cmm.

In those cases in which the pressure was abnormally high, absorption of the clot was effected much more readily by the following method combined with rest, exclusion of light, and the usual local measures: All plethoric cases and those with greatly increased arterial tension were immediately bled from the median basilic vein, according to the method usually employed in venesection. In less robust and anaemic cases, hypertension was relieved by hot-air baths, electric light baths, or hot packs. In the obese, and where bleeding was refused or was impracticable, thyreoid extract gr. ii, t. i. d., was used as a vasodilator and to diminish the viscosity of the blood.

O. W.

The Prognosis and Treatment of the Deep Lesions of the Eye, Associated with Gout, with Special Reference to Secondary Acute Glaucoma.

Bull, Charles Stedman, New York (*Medical Record*, December, 1908), reports having seen, within the past year, an unusually large number of cases showing grave lesions of the retina and chorioid associated with chronic gout. The patients were past middle life, and gouty. These cases of intraocular inflammation followed an intestinal attack, and in all, the urinalysis showed a marked excess of uric acid and a high percentage of indican. All the patients showed the cardiovascular changes usual in chronic lithaemia.

These deep lesions of the retina, chorioid, and sometimes of the iris, often cause impaired vision, enfeebled or abolished function, and a tendency to atrophy and degeneration. The hemorrhages from the vessels show a gradual degeneration of the whole vascular system, and any considerable change in the intraocular tension will cause hemorrhages into the retina, chorioid or vitreous humor, and a recurrence of these hemorrhages under excitement or fatigue is often followed by a secondary acute glaucoma.

This arterial degeneration seems to be hereditary in certain families, and in these cases the evidence of arteriosclerosis in the retinal vessels is often the first symptom of the hereditary condition, and has been seen in comparatively early life. In these cases of retinitis or chorioretinitis there is danger of a development of acute glaucoma. The high blood pressure tends to increase the intraocular tension beyond the normal limits. The treatment of these cases should vary with the age and general condition of the patient, the nature of the lesion and the severity of the type. To reduce the blood pressure the writer employs sodium nitrite combined with a heart tonic.

The writer reports five cases of hemorrhagic glaucoma in which he avoided iridectomy by adopting the following treatment: Under the influence of a strong solution of cocaine paracentesis of the cornea was done, and the aqueous humor allowed to flow drop by drop, from the anterior chamber; the tension being thus lowered very slowly, and the danger of an extensive intraocular hemorrhage avoided. Two leeches were applied to the temple and allowed to remain until they dropped. A solution of eserine sulphate, one grain, and of pilocarpine, four grains, was instilled every hour until the eye softened and the pain was lessened. As the tension subsided and the pain diminished the solution was instilled less frequently. The patient was then directed to use hot applications on the eye for half hour at a time, every two hours until the pain disappeared. Twenty drops of the fluid extract of jaborandi were ordered three times a day as an additional means of lowering the intravascular tension. O. W.

Paralysis of the Abducent Nerve Associated with Otitis Media.

Knapp, Arnold, New York (*Archives of Ophthalmology*, September, 19$8). The unusual association of abducent paralysis with an apparently uncomplicated inflammation of the middle ear has in recent years been observed in a number of cases. In the writer's case this association was particularly clear, and the other symptoms were of interest as throwing some light on the probable connection. These symptoms were, beyond those of an acute otitis media of moderate severity, paralysis of the right external rectus and pain in the right eye, cheek and gums, and inability to chew. This group is suggestive of a lesion in the Gasserian ganglion. It is interesting to observe that this complication of otitis has generally occurred in cases with insufficient drainage; in the writer's case perforation had not taken place. H. G. G.

Voluntary Unilateral Nystagmus.

PYLE, WALTER L., Philadelphia, Pa. (*Journal A. M. A.*, Dec. 5, 1908), reports the rare combination of unilateral and voluntary nystagmus in the case of a young man, aged 22, who complained of asthenopia, headache and some conjunctivitis. Examination disclosed no heterophoria and only a slight astigmatism. The correction of the astigmatism relieved the asthenopia and headache. During the examination a sudden unilateral convergence of the left eye was noticed, with subsequent rapid oscillation, for about thirty seconds. The oscillations could be inaugurated or checked at will. A number of cases of unilateral nystagmus have been recorded. Duane classifies such cases as (1) disjunctive nystagmus, in which the two eyes move, not in parallel directions, but alternately and away from each other, the movements being symmetrical and equal in the two eyes; (2) dissociated nystagmus, in which the movements of the two eyes are unsymmetrical and unrelated; (3) unilateral nystagmus. He believes that most cases of unilateral nystagmus are really of the bilateral type, the movements of one eye being very minute. Unilateral nystagmus may be associated in early life with spasmus nutans or unilateral opacity of the media. In later life, it may arise from unilateral amblyopia or unilateral opacity of the media, unilateral astigmatism and nervous diseases, especially multiple sclerosis. Several cases are quoted to illustrate these facts. Mention of voluntary nystagmus is very rare in ophthalmological literature. The few recorded cases are quoted at considerable length. Occasionally a case of acquired nystagmus is found in occupations requiring long-continued use of the eyes in unusual positions, like fresco painting or coal mining and where the vision of one eye is occluded. Such power indicates inhibition of one eye with voluntary innervation of the other, indicating that the coördinating centers of the two eyes must be influenced along different paths, or by different stimuli, or by cortical impulses coming from different areas. A. F. A.

Reflex Neuroses Arising from Ocular and Nasal Abnormalities.

ZIEGLER, S. LEWIS, Philadelphia, Pa. (*New York Medical Journal,* Nov. 7, 1908), says with regard to reflex neuroses due to ocular abnormalities:

The unbiased observer must concede at least four ocular factors which may become the exciting cause in producing reflex neuroses: 1, ciliary spasm, or strain from uncorrected ametropia; 2, accommodative effort, whether in youth or old age (presbyopia); 3, muscular imbalance; and, 4, painful ciliary scar, or shrunken eyeball. As has been previously pointed out, the underlying, predisposing cause must be present and active. Hence these factors are most liable to originate reflex symptoms in the neurotic subject, while the phlegmatic individual may wholly escape their deleterious action.

1. Eyestrain from uncorrected ametropia stands at the head of the active factors causing these annoying reflexes. It takes its origin in the ciliary effort made to overcome errors in the static refraction, or to correct axial defects. These errors are hypermetropic, myopic, and astigmatic in varying combinations. As the ciliary muscle may act irregularly, spasmodically, and unequally, its action must be wholly suspended by complete cycloplegia in order that the ametropia may be accurately measured. Having carefully ascertained the total refractive error, we must make due allowance for the free play of the ciliary muscle in prescribing the correcting glass. Failure at this point may wholly annul our efforts to remove the exciting cause. Too strong a glass will blur the vision, while too weak a correction will not relieve the strain; hence, failure from either extreme should be avoided by ordering the happy medium.

2. Unusual accommodative strain is a fruitful source of reflex disturbances. The accommodation should, therefore, be tested in every case, and a careful record made. Subnormal accommodation may be found in the eyes of children or youths, as well as in those of adults, but it is manifested chiefly after the age of forty, when it is known as presbyopia.. The eye may be quite comfortable under the distance correction and still suffer whenever near work is attempted. An additional correction for near work must therefore, be ordered in every case of subnormal accommodation, whether young or old.

Neglect of this simple measure will often result in failure to secure the desired relief.

3. Heterophoria, or imbalance of the extraocular muscles, has long been conceded to be a most vicious agent in the causation of these reflex neuroses. Errors in the vertical muscles (hyperphoria) are probably more active because harder to overcome, while the horizontal disturbances (esophoria and exophoria), although more amenable to treatment, are, nevertheless, most persistent in causing these perverted nerve impulses. We have at our command four different ways of remedying these defects: 1, Correction of the error through correction of the refraction; 2, correction of the deviation by the adjustment of prisms for constant wear; 3, orthoptic training or prism exercise; and 4, readjustment of the tendinous insertion by partial tenotomy. Some may escape these deleterious effects through monocular vision, while others with good vision in both eyes may not possess the power of binocular fusion. The physician who ignores the proper correction of muscular errors simply courts failure to relieve many systemic reflexes, by overlooking a most important exciting cause.

4. All observers agree that painful scars may cause annoying reflexes, and scars in the ciliary region are no exception to this rule. Traumatism of the ciliary body, pressure on the sharp spicules of a chorioidal bone, or the undue shrinkage of an old phthisis bulbi have all demonstrated the necessity of enucleation in order to remove the exciting cause. Numerous cases of epileptiform seizure have been relieved in this way, which simply goes to prove the contention of Landon Carter Gray that epilepsy is only a symptom, and may be either central or peripheral in origin.

With regard to the nasal origin of reflex neuroses, Ziegler calls attention to the too often forgotten fact that many ocular symptoms may be duplicated or caused by intranasal lesions. There is a "deadly parallel" of reflex symptoms that will tax one's diagnostic ability to the utmost in properly locating their origin. Many such patients who pass from one oculist to another with but slight change in glasses and but little relief are what might be termed "nasal asthenopes." They will never find ocular comfort until the intranasal lesion is corrected.

The most active nasal conditions to originate these perverted nerve impulses he considers to be three: 1, pressure contact; 2, hyperaesthesia; and 3, nasal obstruction.

He says: "1. The first and most important causative agent is a condition which we may term pressure contact. The middle turbinate bone is usually the offending member, and is so often wedged in between the two vasular cushions of an engorged inferior turbinate and a sensitive septal puff that many mystifying reflex impulses are originated, the most pronounced of which are localized muscular twitchings or choreiform movements of the face, head, and neck, while intense frontal headache and eyeache are more frequent effects. The middle turbinate, however, is not always the offending member. I have seen the pressure contact of a sharp septal spur digging into an inferior turbinate cause similar disturbances, which were promptly relieved by the removal of the spur. The pull of a contracting adhesion between the middle turbinate and the septum may also cause annoying reflexes.

2. Another important etiological element is hyperaesthesia of certain areas in the upper air chambers of the nose. These sensitive points I have found to be most frequently located in a hyperaesthetic area covering the tubercle of the septum, which, when irritated, quickly becomes engorged by vascular dilatation, and thus makes pressure contact against the closely approximated middle turbinate. Irritation of this sensitive area is so provocative of distinctly localized eye symptoms that I have long since dubbed it "the eyespot of the nose." Supraorbital neuralgia, referred eyepain, lacrimation, burning or smarting of the lids, blepharitis, conjunctival congestion and other similar disturbances, may result from this reflex manifestation. The "therapeutic test" of this oversensitiveness may be verified by the simple act of making a local application to this area. This will frequently precipitate an attack which the patient will recognize as very similar to the condition from which he seeks relief. If this area is so sensitive to the mild touch of an applicator, what may we not expect as the result of prolonged pressure contact? In fact, we must accept as an infallible rule the dictum that *pressure contact in the nose will always excite some reflex disturbance when any hyperaesthetic area is impinged upon.* If, therefore, the middle turbinate interferes, it must either be removed, or broken and set over. On the other hand, if the sensitive septal puff is too large or becomes too easily engorged, it must be reduced or "pinned down" by interrupted linear cauterization.

3. The third active agent is nasal obstruction, which, as Pritchard observes, may become an important pathogenic factor. We should never forget that *normal respiration occurs only through the superior meatus of the nose.* Interference with free breathing necessarily produces suboxidation, which, by increasing the sensitiveness of the whole system, renders it more liable to reflex disturbances. In order, therefore, to restore nature's supreme function of unimpeded respiration, it may be found necessary either to remove the middle turbinate, to shrink the inferior turbinate by cauterization, or even to excise the tonsils, if too large; for *without free breathing health cannot exist.*"

Finally, he presents the following points, which should be borne in mind whenever search is made for the exciting cause of a reflex neurosis:

1. The eye and the nose are undoubtedly most important factors in the etiology of reflex neuroses and should, therefore, be carefully examined and positively excluded before beginning a search for other causes.
2. Ocular and nasal reflexes possess many manifestations in common which should be carefully differentiated at the earliest possible moment.
3. Eyestrain, whether from ametropia, subnormal accommodation, or muscular imbalance, should be carefully corrected in order to eliminate the eye as a causative factor.
4. An atrophied eyeball, with contracting ciliary scar, should be enucleated.
5. Pressure contact in the nose will always excite some reflex disturbance when any hyperaesthetic area is impinged upon, and should, therefore, be eliminated.
6. Every obstruction to free breathing should be removed.
7. Recurrence of any reflex neurosis demands re-examination and renewed search for the original exciting cause.

M. L. F.

The Increasing Importance of Tuberculosis as a Cause of Ocular Disease. The Newer Methods of Diagnosis and Treatment.

Derby, George S., Boston (*Archives of Ophthalmology*, September, 1908), reports the results of his observations during the past ten months on the new tuberculin tests, and over a considerably longer period of time on the diagnosis and treatment of tuberculosis of the eye. For his conjunctival test he employs the tuberculin supplied by the H. M. Alexander Co., of Marietta, Pa., and for his cutaneous test a 25% solution, as recommended by Wolff-Eisner. For the control vaccination he uses a solution of glycerin and carbolic acid, made up to correspond to the tuberculin. He has tested about 150 cases; 103 of these are reported in his paper. Of these 83 reacted positively, 18 were negative, and 2 were doubtful. The conjunctival test was performed 61 times; 45 positive, 14 negative, and 2 doubtful. The cutaneous test was performed 58 times; 52 positive, 4 negative, 2 doubtful. On 16 patients both tests were performed. On 14 both were positive; once the skin test was positive and the conjunctival negative, and once both were doubtful. Taking up especially the cases which were thought to be tubercular, he has divided 93 cases as follows: 43 cases classified as phlyctenular disease, of which 38 reacted and 5 did not, about 88% ; 16 cases of relapsing sclero-keratitis, all positive; 16 cases of scleritis, 13 positive, 2 negative, 1 doubtful, 81%. Nine cases he classifies as uveitis, in most of which the disease was in the anterior part of the globe. These were selected as possibly tubercular from their general appearance and from the lack of any other apparent cause. All reacted positively. Of 3 cases of interstitial keratitis, 2 were positive, and the third, a healed case, had eighteen months previously reacted to tuberculin subcutaneously, and had suspicious signs in her lungs. In 4 cases, showing vitreous opacities and cloudiness in the lens, one was positive, 2 negative, 1 doubtful. A case of tuberculosis of the conjunctiva gave a positive reaction.

The other cases were insignificant. In the hands of the writer, the cutaneous reaction has apparently been more sensitive than the conjunctival. He has had no untoward results from the cutaneous reaction; the reaction has varied in intensity from a very slight redness and swelling around the vaccinated area, to a very marked redness and puffiness of some extent, and several times to the formation of a bleb. The writer's experience has led him to fear the conjunctival test in all diseased eyes, even though the process is healed, and in the healthy eye when there is active disease of the cornea in the other. In his treatment he believes that these cases should be handled like other cases of tuberculosis, and if the disease is as prevalent as his figures would tend to show, it will lie within the power of the ophthalmologist to take a more active part in the fight against tuberculosis than he can at present.

H. G. G.

The Diagnostic and Therapeutic Value of Tuberculin in Tuberculous Eye Diseases.

Torok, Ervin, New York (*Archives of Ophthalmology*, September, 1908), regards tuberculin as an excellent preparation, especially the old tuberculin, which he considers one of the best and most reliable agents. He believes that when a patient's eye disease suggests tuberculosis from the circumstances such as age, clinical picture, heredity, etc., and a typical general reaction is present after the administration of small quantities of the T. V. (not exceeding 5 mg.) we can positively make the diagnosis of tuberculosis, even when we do not get local reaction in the eye itself. From a therapeutical standpoint he considers the T. R. an excellent remedy, which, with due care and when properly applied, cannot cause any detrimental effect, either to the eye or to the general condition; on the contrary, it may prove helpful, as it did in most of his cases, to lead to perfect recovery and permanent cure. In addition to the 16 cases published in the *Archives of Ophthalmology*, vol. xxxvi, No. 5, 1907, he reports five new cases treated with T. R. in the New York Ophthalmic and Aural Institute.

H. G. G.

A Clinical Study of Tuberculosis of the Fundus Oculi.

Krauss, W., Marburg, and Brueckner, A., Wuerzburg (*Archives of Ophthalmology*, September, 1908), records the observation, in rapid succession, of two cases of this rare condition and reports in full the interesting features in connection therewith. The cases show a marked similarity in the picture and course of the disease, and there is hardly any doubt that they depend on the same pathological cause. Both were young men with a hereditary taint of tuberculosis. Both date the ocular disease from an injury. The involvement of one eye only, the marked disturbance of function, the painless course, loss of central vision, with corresponding defect in the field of vision, and the limitation of the diseased process to the posterior half of the globe, were striking features in both cases, and there was a similar involvement of the vitreous in each.

The details of the fundus changes, too, were quite alike. The condition of the disk and vessels, showing that there was no primary disease of the nerve or retina, the presence of multiple hemorrhages, yellow gray deposits of varying size, small pinhead size protruding white dots, retinal detachment, with a surrounding zone of white discoloration, the lack of pigment deposits was the same in both. Finally there was the appearance of fresh hemorrhages after the injection of tuberculin, as the expression of a local reaction. H. G. G.

ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

(GREAT BRITAIN AND THE ENGLISH COLONIES.)

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Some Remarks upon Interstitial Keratitis, with Especial Reference to Pathogenesis and to Treatment.

STEPHENSON, SYDNEY, C. M. (*The Ophthalmoscope,* February, 1909). The author treats the subject under the heads of generalities, pathogenesis, and treatment, adding the histories and results of six cases treated by atoxyl.

The frequency of interstitial keratitis is given, according to different authors, as follows: Greef in 36,385 eye patients 0.77 per cent. Collomb in 65,000 cases 0.26 per cent. Mohr, 22,013 cases 0.84 per cent. The author, 5,142 cases 0.95 per cent. Thus it may be safely claimed that in all hospital patients who attend the department of diseases of the eye not more than 1 per cent are affected with interstitial keratitis.

The age incidence of 97 cases, according to the author's cases, are as follows:

Period.	Number.	Percentage.
1 to 5 years	6	6.19
5 to 10 years	38	39.18
10 to 15 years	26	26.80
15 to 20 years	14	14.43
20 to 25 years	8	8.25
25 to 30 years	2	2.06
Over 30 years	3	3.09

Sir John Hutchinson is quoted as having never witnessed a case later than 26 years. The author has seen one case, aged 36 years, whose syphilitic inheritance was attested by notched upper incisors, rhagades at the angles of the mouth, vascular dystrophy, and a node upon the frontal bone.

Sex. Of the authors' cases (99 in number) 38.14 per cent were in males, 61.86 per cent in females.

Sir Jonathan Hutchinson is quoted as saying, as late as 1889, that "interstitial keratitis in its typical form is always a consequence of syphilis, and is in itself sufficient for diagnosis."

The author thinks this view too exclusive, and adds: "Personally, I am persuaded that while parenchymatous keratitis in typical form is usually a manifestation of syphilis, yet a proportion of the cases are the outcome of other factors, of which the more important are tuberculosis, malaria, influenza, and (in animals) trypanosomiasis." It is invariably a local manifestation of some general infective disorder.

The relative frequency of inherited syphilis as the cause of interstitial keratitis varies among the thirteen authors quoted from 20 per cent and 83 per cent, the average being 61 per cent. In his own cases, 101 in number, the per cent was 69.3.

Acquired syphilis has until recently been thought not to be a casual factor in parenchymatous keratitis, but the statistics of four writers are given, where it is claimed to be the etiological factor.

Pathogenesis. "The discovery of the specific cause of syphilis, together with the possibilty of inoculating apes with the virus, has widened our conception of the morbid processes that lead up to the development of interstitial keratitis." The experiments of Bertarelli are mentioned where the spirochaetes were found in the cornea of a rabbit in which interstitial keratitis had been induced fifteen days after scarification with syphilitic material, and, further, keratitis was produced in other rabbits by inoculating with material from the first. Scherber and v. Benedek produced nodular iritis and interstitial keratitis by inoculating the interior chamber of a rabbit's eye with syphilitic virus. The experiments of Greef and Clausen are also mentioned.

Hoffman and Brunig have recently succeeded in producing keratitis by inoculating the anterior chamber of a dog in the cornea of which spirochaetes were found.

The author believes the results of these experiments "leads one to believe" that syphilitic interstitial keratitis is due to the presence (at least in the early stages) in the parenchyma of the cornea of the casual agent of syphilis. But as this has never been proven in patients suffering from interstitial keratitis the chain of proof is still incomplete.

The analogy between syphilitic keratitis and the keratitis observed in dogs and goats affected with nagana and dourine, two diseases closely allied to "sleeping sickness," is shown. In these animals the corneal changes have been shown by Morax and by Stock to be due to the growth of the trypanosome in the interlamellar spaces of the cornea.

The latency of the corneal manifestation is explained by an injury, or general illness may diminish the resistance of a cornea that contained the causal factor of syphilis, as it has been proven that the tissues of a syphilitic baby are "literally flooded" with the treponema.

As regards the eye, Hans Bab found spirochaetes in all the tissues of the eye except the vitreous humor, ciliary processes, and the crystalline lens. In the eyes of three specific stillborn babies, Bab points out that the distribution of the spirochaetes located in the deeper layers of the cornea accords with the well known facts that the investing epithelium remains practically intact in interstitial keratitis. The distribution of the vessels in the tunica vasculosa also explains why specific chorioiditis is more common toward the periphery than toward the center of the fundus. The freedom of the crystalline lens from spirochaetes explains the immunity of that body from syphilitic lesions.

The author states that he and others have demonstrated spirochaetes in seemingly unaffected eyes of syphilitic fetuses and babies.

It thus appears that if the child survive, the spirochaetes (possibly in some intermediate morphological form) lie dormant in cornea, iris, chorioid, and other parts of the eye. They cause no mischief, until some determining cause, of a local or general nature, lowers the resistance of the tissue, and allows treponema to get the upper hand. The result is an attack of interstitial keratitis, of iritis, or chorioiditis, as the case may be.

The author is compelled to dissent the opinion of the dystrophic origin of interstitial keratitis as suggested by Elschnig, and adds: On the experimental and pathological evidence brought forward it must, I think, be concluded that interstitial keratitis is really an infection of the tissues of the cornea with this or that specific micro organism, of which by far the most common is treponema pallidum.

Other infections are those of the bacilli of tubercle and influenza, the plasmodium malariae, and the parasites of trypanosomiasis. In short, I conclude that the keratitis represents an infection as sharply distinguished from a mere dystrophy.

Treatment. The author emphasizes the fact that heredosyphilis is little under the influence of so-called specifics, and recalls that the second eye may become affected even when the patient is fully under the influence of mercury; the chief dependence being placed on local treatment by means of atropine, dionine, and local fomentations. He calls attention to the favorable influence exercised on lingering cases of parenchymatous keratitis obtained from the administration of arsenic in the form of Donovan's solution or atoxyl, an organic compound highly charged with arsenic, which is believed to be almost a specific in cases of sleeping sickness as administered by intramuscular injection. It is given twice or thrice a week in severe cases and once a week in the milder forms in doses from a 0.25 to 0.50 gramme, or 3 3-4 to 7 3-4 grains. A course consists of twelve injections and the total amount of atoxyl does not exceed six grammes. In addition some preparation of mercury is administered by mouth, as he finds the combined treatment more successful, and at the same time useful in preventing such later manifestations as chorio-retinitis, gummata, or juvenile tabes. W. R. P.

Excavation of the Macula with Some Cases Showing Its Association with Atrophy of the Macular Bundle.

Butler, T. Harrison, Oxon (*The Ophthalmoscope* January, 1909). After defining "Macular hole," which was first described by Noyes and later by Coats, the author gives a review of the histology and anatomy of the macula lutea and optic nerve, and reports four cases of "excavature holes," but one of them being a typical macular hole.

He defines "macular hole" as a definite and clinical condition which is sometimes seen in the macular region of the eye, generally after a contusion.

A typical "hole' is a circular or oval spot, generally smaller than the disk, situated at the fovea, and depressed below the level of the retina. The depth is usually less than half a dioptre. The floor of the circular area is much darker in color than the normal fundus, and may exhibit yellowish-white spots. The edge is clearly cut, and may be irregularly crenated. The retina round the hole is often opaque and edematous.

He next describes the macula lutea, laying stress on the thinness of the retina in the middle of the macula and calls attention to the cupping of the external limiting membrane forming a fovea external as mentioned by Max Shultze. The chorioid is thickened at this spot, due to accumulation of capillary blood vessels.

The nerve-fibers of the retina, which are collected into a small bundle and are united into a web with elongated meshes, form a layer which is almost wanting at the yellow spot and which ceases at its center. Those fibers which leave the nasal portion of the macula pass direct to the optic nerve, those from the temporal, the superior, and the inferior aspects, sweep round in a sharp curve and enter the optic nerve on each side of the nasal group. They form the macular bundle and occupy the temporal sector of the optic nerve.

The author next calls attention to the fact that most of the fibers of the optic nerve are chiefly afferent nerves having their trophic centers in the ganglion cells of the retina which fibers can be traced by suitable lesions in the retina.

The author concluded from the anatomical facts it is obvious that the macula must be a weak spot in the retina, therefore subject to rupture. W. R. P.

On Retinitis Pigmentosa and Allied Diseases.

Nettleship, E. (Royal London Ophthalmic Hospital Reports, November, 1908. Abstract continued from *Annals of Ophthalmology*, 1908, p. 528.) There is no lack of fertility in healthy parents who have children afflicted with retinitis pigmentosa nor in those subjects of the disease who themselves become parents.

"Anticipation,"—the appearance of the disease at an earlier age in each succeeding generation—seems scarcely ever to occur. The history usually points to the night blindness having been noticed at about the same age in each generation, very early in life in some pedigrees, rather later in others. Very little material is available to determine whether the kind of cousinship of consanguineous ancestors has any bearing upon the occurrence of the disease and there is similar scarcity of information as to the age of parents at marriage.

There is considerably greater frequency of it in the male sex. When only one sex in a childship is attacked it will be the sex that is most numerous.

Study of the relative order of birth of the healthy and diseased children revealed nothing definite. There is perhaps a tendency for the degeneracies when successive to attack the early rather than the later births.

The list of degeneracies of the central nervous system, congenital defects, and arrests of malformations that occur in retinitis pigmentosa or their siblings or other near relations is well known to be a long one. The commonest is congenital (or at least very early) deafness of various degrees; when complete associated with dumbness. Congenital idiocy and the varieties of mental deficiency, insanity and epilepsy come next in frequency. Other defects are recorded by several authors. Exophthalmic goitre occurred either in the subject of retinitis pigmentosa or in some relation in three families. Glaucoma is now well known as a not very rare complication of advanced retinitis pigmentosa. There is often a history of tubercle in the families in which it occurs, but perhaps this association is due only to the normal frequency of tubercle.

His incomplete data shows that at least 3.3% of persons with this disease may be deaf and at least 4% of deaf mutes may have it.

Much more important than such fragmentary statistics is the observation that certain stocks of retinitis pigmentosa are quite free from any of the complications. Indeed all the most extensive pedigrees of the disease show this immunity from other degeneracies of the nervous systems, deafness, idiocy, and the like, and it is doubtless this strict limitation of the inheritance to a character or an organ not of vital importance that enables the family to survive.

Not only does the night blindness of retinitis pigmentosa begin some years before pigment is visible and the age at which the typical system is observed vary within wide limits; but in cases examined at a stage which seems from the history to be the same, differences in the apparent quantity and distribution of the pigment and its exact site in relation to visible retinal vessels are often noticed and similar variations occur in the degree of diffuse retinal haze and disturbance on removal of the pigment epithelium. The state of vision both as to field and acuity is, I believe, closely associated with the size of the retinal arteries except when there are changes in the macula. The time at which the disease culminates in blindness varies from birth or early childhood to advanced old age and these wide limits depend partly on variations in its rapidity and not entirely on differences in time of its commencement.

The first ophthalmoscopic change seems to be the same —an irregularity in the distribution or appearance of the pigmented epithelium and soon after this or perhaps at the same time, minute pale dots or spots appear amongst or between the pigment cells. The result is a general dappling or mottling appearance. These early changes are commonly limited to the periphery, but in atypical cases they are seen also at the central area. The characteristic subsequent pigmentation of the retina seldom, however, affects the central region, even when the early changes have occurred there.

In regard to the earliest pathological changes, Stock from his work concludes that the bacillary layer is the first structure to suffer, the chorioid and the pigment epithelium being affected only in a secondary manner.

The author reports some cases showing that slight though characteristic deposits of pigment may be ophthalmoscopically visible in the inner retinal layers certainly at from three to six years of age and probably as early as fifteen months and that the changes may be quite advanced at seven or eight.

The regional distribution of the pigment may be more or less peripheral or equatorial and may form a complete or broken belt. Marked differences are seen in different patients in the size of the individual deposits and in the area of space enclosed by them, such variations being conditioned largely by the grade of the vessels in the walls of which the pigment has been arrested. When the vessels so ensheathed are large enough to be seen, careful observation shows that they are invariably veins. In spite of much careful research he has never seen an artery with pigmented coats. The pigment always travels in the direction of the blood current. The quantity of the pigment in the retina is not related to the complexion of the individual nor to the general pigmentation of the chorioid.

The age at which blindness becomes complete varies within wide limits. Useful vision is lost between thirty-five and forty in a large number of cases. We do not know whether the cases of so-called senile retinitis pigmentosa illustrate late commencement of the disease or only very slow progress. Cases occur at all ages in which the classical symptom of night blindness has been absent or unnoticed even when the retinal changes were strongly marked. Ring scotoma is frequently present but often escapes detection.

Under variations in the ophthalmoscopic changes, he states that retinitis pigmentosa with central changes is not very uncommon. Central vision is much damaged in such cases and the patients instead of being night blind often prefer rather dull light. Retinitis pigmentosa sine pigmento usually signifies nothing more than the initial stage of the ordinary disease, for pigment in small grains confined to the outermost layers of the retina may be invisible, but in time the pigment travels into the inner layers and then becomes visible. Another variety has been provisionally separated under the title "Atrophia gyrata chorioideae et retinae" by Fuchs. A few cases have been described where little or no ophthalmoscopic appearance of the chorioid existed except over a small area at the yellow spot. This deficiency of the chorioid is probably congenital. The name retinitis punctata albescens which has been given to several conditions should be restricted to the cases, apparently quite rare, in which the fundus is sown fairly evenly with innumerable discrete white dots entirely free from pigment, dull or dead like white paint, affecting the central region as well as or even more than the periphery, apparently dating from birth or early life and remaining, so far as is at present known, stationary; the dots are always small and may be invisible by the indirect method. The disease is a family one, but has not been seen in more than one generation. The parents are often consanguineous. Acuteness of vision may be much or scarcely at all damaged. but there is night blindness dating from the earliest recollection. Study of the recorded cases shows that typical retinitis punctata albescens may occur in the same family with retinitis pigmentosa. We have in it a variety of retinitis pigmentosa but one that differs widely from the type not only in the visible changes but in the vitally important feature that it is stationary, or, at the worst, almost indefinitely slow in progress.

Congenital stationary night blindness without changes is for practical purposes subdivided into two groups. In both groups the night blindness is strongly marked and accompanied by contraction of the field when the light is much lowered, and no length of stay in the dark enables the affected person to see any better; and in both the condition is hereditary. In the first group the night blindness is not correlated with any other condition; visual acuteness is normal in almost all, the fundi are absolutely healthy, refraction normal or if abnormal not always erring in the same direction; both sexes suffer in fairly equal numbers; either parent may transmit to children of either sex; and descent has been continuous in the pedigrees that have been most carefully worked out. In the second group the leading features are myopic refraction; limitation of the disease to the males, but transmitted through the females;

visual acuteness with correction often but not always subnormal; slight ophthalmoscopic changes sometimes found, though their inconstancy throws doubt upon their relation to the disease. He then gives a history showing the salient features of every case that he has been able to find belonging to these two groups. W. E. B.

Certain Points in Regard to the Fields and Fundus Changes in Obstruction of the Central Artery of the Retina.

HANCOCK, W. ILBERT (Royal London Ophthalmic Hospital Reports, November, 1908). The author reports two cases of obstruction of the central artery of the retina with preservation of some vision in the temporal portion of the field and after a study of the literature of cases of obstruction is able to report twenty-five cases in which vision remained in the periphery. With reference to the part of the field preserved he found it to be as follows:

Temporal	in	20
Eccentric	“	1
Upwards and inwards	“	1
Upwards and inwards; later temporal only	“	1
Quantitative p. l above, below, and internally with counting fingers in temporal field	“	1
Hand movements	“	1
		25

In von Graefe's case the hand movements could be seen in the temporal field beyond the 20° line, and in the author's two cases in the inner limit of the preserved field was about 50° on the perimeter.

In several cases the patient said that they were completely blind at the onset of the attack but later after a few hours or few days some sight returned. In a few cases the recovered vision is said to have been lost on a later date. The majority of recorded cases have been followed up only for a few weeks so that it is impossible to say whether this indefinite retention of the remaining field is usual. The explanation is not easy why if the obstruction is complete any field is preserved and why the preserved portion is so commonly on the temporal side and in the extreme periphery.

He suggests four possibilities to explain the first question and gives as his own opinion that the extreme anterior limit of the retina in many eyes is nourished by the chorio-capillaris alone, its vitality being therefore maintained after the blood supply from the retinal artery has been cut off. A study of comparative anatomy lends some support to this fact as in many of the lower animals the retina depends entirely upon the chorio-capillaris for its nourishment, while in others there is an obviously inadequate retinal circulation, which supplies that structure over a limited area only, in the vicinity of the disk. It is not unreasonable therefore to assume that in many human eyes the extreme peripheral retina situated at the maximum distance from the entrance of the central vessels is nourished in a part or in the whole of its circumference by the chorio-capillaris.

In explanation of why the temporal portion is most easily preserved he shows that of all the parts of the peripheral retina the nasal is the most functionally active, the other parts being cut off by the nose, the brow and the cheek, are to all intents and purposes functionally inactive, moreover the retina extends further forward on the nasal side, hence vision is more likely to be preserved in the temporal periphera than elsewhere.

In regard to the nature of the retinal opacity observed after obstruction of the central artery he thinks it probable that the condition at least in the early stages is not an edema but rather a necrosis of the superficial retinal layers and possibly that form of local death to which Cohnheim gave the name "Coagulative necrosis." W. E. B.

Forms of Retinal Disease with Massive Exudation.

Coats, George (Royal London Ophthalmic Hospital Reports, November, 1908). In this very interesting monograph of eighty or more pages the author reports in detail the clinical histories, ophthalmoscopic examinations and complete pathological examinations with numerous micro-photographs of sections of the eyes of six cases which form with other similar records from the literature a fairly well defined group. He also reviews the literature of all the cases reported which would apparently belong to this group, discusses their pathology and concludes that "they constitute a disease of the retina, hitherto insufficiently differentiated, which is characterized by the presence in the fundus of large masses of white or yellow exudation; usually there are also groups of cholestearin crystals and hemorrhage The affection occurs in young people, most commonly of the male sex, whose general health is usually perfect. No definite connection with former illnesses can be established, nor does the family history as a rule reveal anything of importance. The commencement is commonly unnoticed, and the course very slow; in some instances the eye is eventually lost from detachment of the retina, secondary cataract, iritis or secondary glaucoma; in other instances quiescence is attained before these results ensue.

"In an allied form of the disease, or in a variety of the same form, strange types of vascular disease are found—fusiform and globular expansion, kinks, loops, glomeruli, etc.—as well as the more common types, such as constriction, white ensheathing, etc. The other characteristics of this group are similar to those of the first, but probably in consequence of the vascular disease the cases are less often quiescent, and are more frequently followed by the injurious sequelae mentioned above.

"In the only case of this disease which has so far been examined in a recent stage, the white mass in the fundus was found to be due to a disintegrating hemorrhage seen through retina which was thickened and infiltrated with swollen leucocytes. The hemorrhage was connected with the outer strata of the retina, and was therefore presumably derived from the capillaries of the outer reticular layer, the most external layer in which capillaries normally occur; it had broken through into the subretinal space, and in its periphery slow organisation was taking place. The chorioid had practically no share in the process. The opaque exudation seen in the fundus apart from the main mass was due to crowds of swollen leucocytes in the subretinal space.

"In the subsequent course of the disease, as shown by the other, older cases, the process of organisation is completed and cicatricial contraction sets in, crumpling up the retina and causing further detachment. The hemorrhage breaks down completely, and may be totally absorbed; more usually, however, a small cavity remains among the cicatricial tissue, filled with debris, cholestearin crystals, and calcareous particles. The disease is now obsolescent, except when vascular disease is present, and gives rise to new hemorrhages.

"The exact significances of the vascular changes found in some cases is not yet fully made out. They occur in three chief forms: (1) Dilation with little change in the wall. (2) Thickening of the wall with hyalin degeneration and nuclear fragmentation. (3) Collections of inflammatory cells in the wall and in the perivascular lymph spaces. Some, perhaps all, of these changes are probably secondary (a) to obstruction caused by cicatricial contraction, and (b) to the action of low grade irritants, such as are always produced by disintegrating blood, constituting the stimulus to the surrounding tissues, which result in the chronic inflammatory process known as organisation. On the other hand, it is possible that some of the vascular changes are primary and the cause of the hemorrhage; but against this explanation are to be set the youth of the patients, and the fact that the disease is commonly unilateral. Other possible explanations of the hemorrhage are: Hemorrhage at the time of birth; hemorrhage due to constitutional conditions, perhaps associated with alterations in the coagulability of the blood, and perhaps in exceptional cases, hemorrhage due to strain and injury. It is probable that no single hypothesis will cover all the cases.

"There is another form of disease, also with massive exudation in the retina, which is characterized by the formation of arterio-venous communications, with enormous enlargement of the affected vessels. In the youth of the patients attacked, in the absence of an evident etiology, and in its general course and termination, it has many points of resemblance to the cases already mentioned, and possibly it is allied. But the few pathological examinations which have been carried out do not altogether support this, but speak rather of a truer vascular new formation in the retina. In the meantime, therefore, it is better to classify them separately." W. E. B.

Serum-Therapy in Ophthalmology.

Axenfeld, Prof. (*Ophthalmic Review*, January, 1909). The paper is based upon "what therapeutic means have modern researches on immunity placed in the hands of ophthalmologists? What successes have been hitherto obtained, what rules are indicated in dealing with different diseases, and what are the future prospects of this therapy?"

"The eyelids, the conjunctiva, the orbit, the uvea will in future take part in serum-therapeutics as do the other vascular organs. For infective disease of the eyelids the same rules hold good as in the case of the skin in general. In obstinate blepharitis and formation of hordeola the subcutaneous application of staphylococcus-vaccine, which may be readily prepared from the patient himself according to the directions of Wright, may prove useful, as may the Sobernheim-serum in the rarely occurring cases of anthrax.

"But the conditions are quite unique in those non-vascular refracting media, which taken together form by far the greater part of the volume of the eyeball, and in which bacteria can grow in quite an extraordinary manner, so enormously indeed, that in the vitreous even saprophytic germs can become pathogenetic."

Axenfeld states "that Loeffler was the first to point out that the normal cornea shares in general bacterial immunity. Roemer proved it with regard to pneumococci, and Ehrlich and Roemer in regard to autotoxic immunity to the toxin of diphtheria. We are entitled to suppose that the cornea would share also in other autotoxic or 'bactericidal' immunity. But we must not asume off-hand that this holds good to the same extent for every kind of infection. In this respect the results of small-pox vaccination are of great interest. This oldest of all immunizing methods, originated * * * by Jenner and which has long exerted and still exerts such a beneficial influence on the frequency of blindness, immunizes by the subcutaneous or intravenous injection the whole body, and only the cornea remains susceptible, although the cornea, if vaccinated itself, acquires a circumscribed local immunity."

Of the anterior chamber Axenfeld says, "we know from the work of Roemer, Wessely, zur Nedden, A. Leber, Schneider, Rymowicz, Possek, etc., that into the normal aqueous humour antitoxins, agglutinins and precipitins (Receptors: first order) pass from the blood, in small quantities to be sure, whilst on the contrary bactericidal substances, opsonins, hemolysins, and cytotoxins (Receptors: third order) do not do so at all. Only after puncture or irritation by means of subconjunctival injections, by heating and especially under the influence of inflammation is the entrance of these substances to be observed.

"The vitreous finally does not under normal circumstances share in any kind of immunity whatever. It only begins to show traces of immunity bodies after frequently repeated paracentesis or subconjunctival injections or during inflammation.

"It is upon these facts that Roemer's law of 'retention of cytotoxins' is based. Consequently a antibacterial serum-therapy, active or passive, must in intraocular disease, in which the infection has extended to the media, experience great difficulties in its combat against the bacteria."

That although serum-therapy will only be of assistance as an adjunct in cases of corneal and intraocular infection it should nevertheless be tried in virulent infection especially in acute cases; alone it will not be sufficiently powerful; special investigation for each different kind of bacteria are necessary to teach us the different processes of serum-therapy.

Antitoxic Serum. The action of Behring's antitoxic diphtheritic serum is well known. Cases of conjunctivitis in which the diphtheria bacilli have been found, that do not yield to serum treatment, have had treatment commenced too late or there is a serious mixed infection probably streptococcal. For the latter reason many of the corneal infections are not influenced, although improvement of nutrition may be of value to the cornea.

The post-diphtheritic paralysis of accommodation has been treated with the serum; Fage maintaining it has disappeared more quickly under such circumstances than usual. Statistics on serum treatment of the throat diphtheria shows an increase in the number of cases of post-paralysis; probably because more severe cases live.

Tetanus-serum. In the rare cases of tetanus following eye injuries, the rule holds good, i. e., if tetanus has already set in, the success of serum-therapy can no longer be reckoned upon with certainty; although larger doses than have hitherto been administered may produce better results.

The prophylactic action of tetanus-serum is at any rate greatly superior. Consequently Axenfeld suggests that ophthalmologists should make it a rule to inject prophylactically 10-20 cc of tetanus-serum in especially suspicious looking injuries; i. e., those contaminated with earth, manure, street mud, etc.

Dunbar's pollantin is mentioned, Weichart denying the antitoxic character of this serum and has prepared another remedy known as "Graminol" which in his opinion is an "anti-kenotoxin." The writer states that both preparations are good in some cases, but not in all, and that the result is not always lasting, but suggests their use in hay fever conjunctivitis.

Roemer's jequiritol-serum. With this, the action must be strong enough to clear the pannus cornea, but must not be too strong if necrosis is to be avoided: Roemer drops in the eye first a weak solution, which produces a slight local antitoxic immunity, which prevents a too powerful influence of the subsequent stronger solutions. If the reaction is even then too violent instillation of the antitoxic antiabrin-serum will render the symptoms milder.

Experience differs as to the preventive and curative effect. This with the possibility of complication has restricted the use of jequiritol to those cases where the possible improvement is of greater importance than the possible complications.

Subcutaneous injections are more efficacious.

The unpleasant complication of dacryo-cystitis may perhaps be avoided by prophylactic injection of the serum into the sac immediately before dropping it into the eye, this does not interfere with the jequiritol reaction of the conjunctiva.

N. M. B.

(To be continued.)

The Treatment of Septic Conditions of the Eye by Means of Vaccines.

Cormsdale, Harold (*The Ophthalmoscope*, January, 1909). After calling attention to the rarity of cases treated by emulsion of dead bacteria by ophthalmic surgeons, the author reports two cases successfully treated by this method.

The first case was one of cataract extraction. No complications until the sixth day, when attack of iritis set in which rapidly assumed the appearance of a septic inflammation. As the wound had closed early and showed no signs of local infection, the inflammation was thought to be metastatic in origin, and was treated by emulsions of staphylococci. A small dose (100 millions) was given by the mouth. An examination of the blood showed a normal index for several other possible organisms, but a lowered index toward the staphylococcus.

Within 48 hours iritis had become stationary, and in another two days there was evident improvement, as small hemorrhages which had occurred in the anterior chamber had cleared up, the aqueous had cleared, the iris was better color, and pain was less. In all six doses were given between June 16th and July 24th. The dose was increased from 100 to 700 millions. At the end of August the eye was free from infection, the iris bright; the pupil was blocked with a dense membrane; vision, 1-60; projection perfect, tension normal. The iris was a little bombe.

On October 29th the after cataract was divided, when a vision with correction of 6-9 was obtained.

The source of infection on this case was not determined.

The second case consulted the author for failure of vision in right eye which had been observed about one month. Examination showed detachment of the retina with many vitreous opacities, but nothing to suggest the presence of a neoplasm. Some months later the lense was becoming opaque and tension increased. Later the eye red and painful; iris muddy green. Enucleation was advised, but refused. On inquiry as to the possible cause of the infection, she gave a history of an abscess in her mouth which had ceased to discharge but two days before.

She was given a dose of emulsion of staphylococci (100 millions) and the eye rapidly became quieter. After an interval of seven days a second dose of 200 millions and later a third, 400 millions. The eye resumed its usual appearance, was free from redness and pain and immediate necessity for excision was gone.

The treatment was given empirically as in neither case was the exciting organism found. W. R. P.

Fibrolysin in Ophthalmic Practice.

Grossman, Karl (*Lancet*, January, 16, 1909) refers to the good results obtained with thiosinamine in lupus and in softening cicatricial tissue. Its use by mouth not being suitable and subcutaneous injections were so painful because the drug was soluble only in alcohol or ether that its use became impracticable until Dr. Mendel of Essen suggested combining one molecule of thiosinamine with one-half molecule of salicylate of sodium which allowed of easy solution in water and the absence of any irritating effect when injected subcutaneously.

"The effect of fibrolysin on cicatricial tissue is very remarkable; turgescence takes place, the individual fibers lose their sharpness of outline, the nuclei are pushed asunder and the tissue appears more succulent and swollen and altogether enlarged. The whole scar becomes more relaxed and permits of movements altogether impossible before injection. This effect is considered to be due to a serous infiltration or flooding which slackens the old inflammatory and now hardened fascicles similarly to the hyperemia of the Bier method, and renders them thereby more readily amenable to absorption by the increased lymph stream. This result, transient at first, becomes more and more permanent by repeated injections. It is noteworthy that fibrolysin has this effect only on pathological connective tissue.

"The mode of application is by injection, either intra-venous, intra-muscular, or subcutaneous. The intra-venous method would be suitable only where a very rapid effect is desired and it would be advisable to select for this purpose large veins, where the danger of thrombosis from injury to the epithelium is comparatively small. Secondly, there is the intra-muscular injection, and as the best locality for injection the glutaei have been recommended. But this appears unnecessarily inconvenient for the patient both physically and psychically and affording no advantage over the third method, namely, that of hypodermic injection. As for locality I have in all cases chosen the upper arm as likely to cause the least amount of inconvenience."

A case of cicatricial contraction of upper lid following a scald is reported in full, a case of retrobulbar neuritis following influenza, the results with corneal opacities have not all been equally good; has had great success with two cases of posterior synechia of old iritis of rheumatic origin in which atropine alone produced no result.

Some of the disagreeable symptoms that follow the injection of fibrolysin are: "A burning sensation round the point of injection lasting half a minute to a couple of hours, discoloration of a yellowish, later bluish, tint, formation of a hard nodule of the size of a cherry which may take weeks or even months to disappear. There are also general symptoms reported: headache, lassitude, heaviness, lasting from a few hours to a day or more.

"Dr. Urbantschitsch mentions a case where regularly about 12 hours after each injection menstruation occurred, this completely resembled the normal menstruation and lasted from two to three days. For this reason further administration of the drug had to be abandoned in this instance. Another case is mentioned in which epistaxis occurred." N. M. B.

A Successful Lacrimal Syringe.

HARMAN, N. BISHOP (*Ophthalmic Review*, December 16, 1908). The success of the syringe depends on the relation of the piston and the cylinder. These fit quite closely, so loosely that when the syringe is hung vertically by holding the handle of the piston rod the barrel descends by its own weight! And yet so perfect is the action of the syringe that it will suck water through the fine nozzle, and that without admitting air into the barrel; or conversely, the water can be ejected for some ten feet by a very little pressure of the piston, without leakage from the joint or regurgitation. The perfection of the compression of the syringe depends upon the narrow circular groove in the solid metal plunger. The groove holds a cushion of air, which makes a perfect packing and prevents regurgitation, but allows of perfect freedom of motion by the piston. (Some of the syringes sent out have a wire ring set in this groove to prevent the piston working too easily, but for ophthalmic purposes it is best to remove the wire.)

The barrel of the syringe is of glass, and the mounts are secured to it by a metal packing, which allows of boiling without fear of losing them.

There are two nozzles; one long and slender, the other short and stout. The mouths have winged butts which greatly facilitate the fixing and detachment of the nozzle.

The collar which holds in the piston has a bayonet lock, and the projecting rim of the collar is wide enough to give a good grip to the fingers. This rim has two "flats" on it so that the syringe cannot roll off the table. N. M. B.

The Bacteriological Examination of the Aqueous Humour.

HARMAN, N. BISHOP (*Ophthalmic Review,* December 1908). speaks of the difficulty of securing sufficient quantity of aqueous and to insure absence of contaminating conjunctival organisms.

A hollow spear-headed needle is described which may be attached to the lacrimal syringe elsewhere mentioned. It is inserted into the anterior chamber just as one would a Bowman's needle; the eye of the needle looking toward the cornea. After removal of the aqueous the anterior chamber may be refilled with sterile normal salt solution without removal of the needle. N. M. B.

Entopic Researches Into the Structure of the Vitreous.

BURDON, COOPER J. (*Ophthalmic Review,* December 1908), gives a very interesting description of entopic vision and the special method made use of for observing the interior of the eye.

Light of small dimensions situated as close to the eye as possible is made use of, so that divergent rays which cannot be focused upon the retina enter the eye.

Focusing the source of light upon a screen with a single small perforation held close to the eye, the light reflected from a white bank of clouds, illuminated white disk and admitted into the eye through a fine puncture in a thick black card, a highly polished metallic knob, the surface of a convex lens, the highest objective of a microscope may all be used.

A small glass sphere 1 to 2 mm. in diameter made by fusing one end of a fine capillary tube until a small bead forms gives an extremely simple and effective method. The apparatus is blackened by holding in a match flame, all except the small bead. Beads of different size should be made to secure different intensities of illumination. The bead is held between a source of light and the eye, close to the latter. Then follows a very interesting description well illustrated of the various entopic conditions found, which must be read to be appreciated. N. M. B.

Acromegaly.

Rankin, Guthrie, and Moon, R: O. (*Lancet,* January 2, 1909), in describing this disease refers to the eye conditions as follows: "The visual apparatus is in one way or other disturbed—exophthalmos may constitute a striking feature; ptosis and other paralyses of the oculo-motor muscles are not infrequent; nystagmus is sometimes present; and the loss of the temporal field of vision, which is common, affords valuable diagnostic evidence of pressure on the optic chiasma. The fundi may remain normal, but in some cases there is evidence of optic atrophy." N. M. B.

The Restoration of Vision in the Squinting Eye.

Bradburne, A. Alison (*British Med. Journal,* January 2, 1909). The author begins by paying a tribute to the researches of Worth in the matter of the fusion sense, and says that in squint we nearly always have, (1) some error of refraction: (2) a defect in the fusion sense; (3) a defect in the vision of the squinting eye which varies with the age of onset and duration. It is held by the majority that six years is the limit, beyond which a perfect cure of squint, involving these factors, cannot occur. There are undoubtedly exceptions to this rule. Up to six years the amblyopia and defective fusion sense may be overcome by the use of Worth's amblyoscope, but after six it is probably necessary to use other methods—prism exercises, the exclusion pad, etc. The case of a boy of 11 is cited, who began to squint when two years old. Glasses had been prescribed when he was four. The vision in the right eye at the beginning of treatment was 5/60. In six months' time the vision had improved to 5/5, and binocular single vision was obtained.

E. S. T.

Notes on a Case of Buphthalmia.

McIlroy, Janie Hamilton (*British Medical Journal,* December 12, 1908, p. 1745). A case of buphthalmia in a boy of 12 is reported with full notes. The usual history is given and the clinical conditions as commonly observed are described, but a careful note made eight years previously is quoted to show that only a very slight advance in the condition took place in that period of time. E. S. T.

On the Use of Lenses Specially Adapted for the Estimation of Bifocal Vision.

TOOKE, F. T. (*Montreal Medical Journal* August, 1908). Another interesting example of coincidence of thought is the almost simultaneous suggestion of Tooke and of Stewart in regard to the use of bifocal lenses in trial cases. At the Canadian Medical Association, in June, 1908, Tooke read a paper describing a series of lenses of this character, made at his own suggestion, which he had found serviceable in the explanation of a great deal of what bifocal glasses will and will not do, and as a prevention of misunderstanding on the part of both consultant and patient in regard to their use. The same ideas are put forward by Stewart in his description of a new trial case in the July number of the *Ophthalmic Record;* and more recently lenses of this sort have been advertised by a well known firm of opticians. W. G. M. B.

Paralysis of the Sixth Cranial Nerve in Aural Disease.

BARR, J. STODDART (*The British Medical Journal*, September 26, 1908). The author presents two cases. Both patients had long standing purulent disease limited to one ear with extensive mastoid involvement including both antrum and mastoid cells. In both there were symptoms pointing to intracranial involvement; namely, headache, nausea and vomiting, diplopia with paralysis of the sixth cranial nerve and marked double optic neuritis. In both an extradural abscess over the sigmoid sinus was found at the operation and in both cases there eventuated complete recovery from both the sixth nerve paralysis and also the optic neuritis. The only symptom not common to the two cases was paralysis of the facial nerve which occurred in one and disappeared after a time. The greater portion of the paper is given up to a discussion of the paralysis of the sixth nerve and how it is produced. He concludes that it was highly probable that the suppuration in the space of Dorello gives rise in many instances to a serious meningitis localized it may be to the anterior cisterna. This would account for the frequency with which double optic neuritis, headache, vomiting, slow pulse, etc., are observed in association with this form of paralysis of the sixth cranial nerve. W. E. B.

ABSTRACTS FROM GERMAN OPHTHALMIC LITERATURE.

BY

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PHILADELPHIA.

A. C. Sautter, M. D.,

PHILADELPHIA.

Frederick Krauss, M. D.,

PHILADELPHIA.

AND

Meyer Wiener, M. D.,

ST. LOUIS.

The Cure of Trachoma by Bequerel Rays (Radium).

Selenkowsky (*Arch. f. Augenheilk.*, Vol. LX-1, p. 63) found that 10 minute exposures of the conjunctiva of rabbits' eyes with 10 mg. radium bromide were without danger for the eyes. He has treated 25 cases of granular trachoma with radium, with cure in *all* cases. The method was as follows: the lids were everted and 10 mg. radium were placed in the diseased parts for not more than 10 minutes. The milder cases required exposures of only 2-3 minutes. Usually 10 sessions were sufficient. 80 cases of other types of the trachoma were likewise treated, with very good results, the radium having quieting influence upon pain. More than 10 mg. of radium cannot be used for fear of danger to the eye. E. A. S.

Contribution to the Study of Diphtheritic Conjunctivitis After Measles.

Laugier (Thése de Lyon, 1907, ref. in *Klin. Monatsbl. f. Augenheilk.*, September, 1908, page 340) says that diphtheritic conjunctivitis, which appears in children after measles, is a serious disease, which is fatal in 40% of the cases, causes loss of the eye in 25%, and *restitutio ad integrum* in only 25%. The statistics collected by Laugier show that treatment by diphtheria antitoxin, in subcutaneous injection and local instillation, do not influence the prognosis of the disease.

E. A. S.

The Cure of Trachomatous Pannus by Inoculation with Blennorrhea.

Goldzieher (*Pester Medizin.-chirurg. Presse,* 1908, No. 15 Ref. in *Wochenschr. f. Ther. u. Hyg. des Auges,* May 28) concludes from an experience with three cases, that the inoculation of blennorrhea in trachomatous pannus is the *ultimum refugium,* and is not more dangerous than jequirity ophthalmia. The method is only indicated in pannus crassus. After the disappearance of the inoculated blennorhea, not only was the cornea clear, but the conjunctiva had regained its normal condition (in contrast to the result obtained by jequirity.)

E. A. S.

Concerning Diplobacillus Conjunctivitis, with Especial Reference to the Corneal Complications.

Bartz (*Centralbl. f. prakt. Augenheilk.*, August, 1908, p. 253), in his inaugural dissertation, says that 210 cases of diplobacillus conjunctivitis were seen out of 6591 patients in the eye clinic at Rostock, in the course of two years (3.18%). Of these 23 were complicated by corneal ulcer, iritis or hypopyon. In nine there was a history of traumatism. Zinc solutions were found to be insufficient in the treatment of the complications, so that other measures were necessary (Saemisch section, and galvanocautery). E. A. S.

The Demonstration of the Trachoma Bodies in Section, and Within the Tissues.

Di Santo (*Archiv f. Augenheilk.*, October, 1908) reports briefly the method by which he has been able to demonstrate the presence of trachoma bodies in sections of the affected tissues, in Greeff's laboratory in Berlin. A piece of the conjunctiva was excised, hardened in alcohol, and imbedded in paraffin. The 8 to 10 microns thick sections, after removal of the paraffin, were stained by Giemsa solution for 4 to 5 hours, washed in alcohol (6 to 8 minutes) and examined in cedar oil. The trachoma bodies were seen in large numbers beneath the epithelium and exactly in the adenoid connective tissue of the mucous membrane. They were often visible in the protoplasm of the cells, also in the fibers of the connective tissue, but most frequently free in the spaces of the tissue. They have a marked tendency to group themselves in pairs, as diplococci, although this cannot be well seen when they form large masses. Often in the isolated specimens they are seen to be surrounded by a clear space in the Giemsa staining. Illustrative sketches are given, and detailed report will be made later. E. A. S.

Contribution to the Study of Trachoma.

Mohamed Eloui Pascha (First Egyptian Medical Congress, December, 1902. Ref. in *Centralbl. f. prakt. Augenheilk.*, August, 1908) says that trachoma has greatly lessened in Egypt, during the last 20 years, in the schools for example from 85% to 57%. Among 11,660 patients 17% had trichiasis, 10% various forms of keratitis, 6% pannus, 5% glaucoma, etc. Its frequency in Egypt is partly due to the defective culture of the populace, and also to climatic factors (sudden changes in temperature, dampness after the Nile inundations, 7 months of hot weather). He recognizes a pure granular form, and a mixed granular form with conjunctival hypertrophy. Conjunctivitis granulosa and conj. purulenta are both etiologically and anatomically to be strictly separated. Chronic purulent, catarrhal and pseudomembranous conjunctivitis produce an hypertrophy of the papillary body, which is not trachomatous. E. A. S.

Concerning the Socalled Trachoma Corpuscles.

Mijaschita, S. (*Klin. Monatsbl. f. Augenheilk.*, November, December, 1908), reports positive findings of the trachoma corpuscles described by Prowazek, Halbertstädter and Greeff in five cases in the clinic of Prof. J. Komoto, in Tokio, Japan. He was unable to cultivate them or successfully infect animals' eyes, but produced positive infection in three cases by inoculation in patients at the clinic. He confirms the occurrence of acute trachoma, which has been occasionally disputed, but says it appears very rarely and may have a bad prognosis. He could discover no difference between the cases which arose spontaneously, and those artificially inoculated. The incubation period was 7 days on an average, and during this time the organisms could not be found. He belives with Axenfeld that there may be at times a local immunity to trachoma, and describes an appearance of the corpuscle in the epithelial cells, which differs somewhat from the original finding of Prowazek, and thinks it may represent a very early stage in its development. E. A. S.

Trachoma and Its Cure.

Hamburger (*Wiener mediz. Wochenschr.*, No. 19, 1908), in trachoma, again urges the use of massage with wood cotton, wrapped in organtin, and dipped in sublimate solution of a strength of 1:1600, and later 1:800. In early cases one or two applications are sufficient, in chronic forms 8 to 10 are necessary. E. A. S.

Therapeutic Experiences in the Use of Jequiritol for Corneal Opacities, Especially for Pannus Trachomatosus.

Hoor (*Centralbl. f. prakt. Augenheilk.*, August, 1908) says that jequiritol is of no value in the presence of granulations and follicles of the conjunctiva in trachoma, is contraindicated in purulent processes and fresh opacities of the cornea, but strongly indicated in cases with fresh pannus, with cicatrized and degenerated conjunctiva, and with old resistant opacities. It should not be used with out-patient cases, as it is not without danger (infiltrates and ulcers of the cornea, lacrimal sac phlegmons, etc.). The more violent the first ophthalmia the more difficult is it to produce a second one, and the more scarred the conjunctiva, the more difficult to produce ophthalmia. The ophthalmia lasts from 4 to 15 days. Jequiritol serum lessens the severity of the subjective symptoms, but does not affect the objective ones. E. A. S.

Some Remarks Upon the Treatment of Conjunctival and Corneal Diseases with Jequiritol.

Cosmettatos (*La Clinique ophthalmologique*, 1908, No. 3) had good results in chronic trachoma with fresh pannus by the use of jequiritol, the corneal opacities almost entirely disappearing. In longer standing pannus there was some improvement, especially if the jequiritol was used 2 or 3 times. The result was also good in a case of fresh parenchymatous keratitis, both corneas clearing up almost completely. In fresh trachoma the treatment was unsuccessful. The author saw only one unpleasant complication out of 12 cases, viz., a decided infiltration of the cornea. E. A. S.

A Diffuse Melanosarcoma of the Conjunctiva, with Remarks Upon the Pigment Tumors of this Membrane.

Lauber, Hans (*Zeitschr. f. Augenheilk.*, XIX-1, p. 132) demonstrated two cases of diffuse melanotic sarcoma of the conjunctiva before the Vienna Ophthalmological Society. In the second case the growth involved both eyelids and the entire bulbar conjunctiva, and in its removal the eyeball and both lids were sacrificed. The orbit was exenterated and covered by a flap by Küster's method. No recurrence was observed in 2½ years, a fact which agrees with the usual experience that melanosarcoma of the conjunctiva rarely gives rise to metastasis. E. A. S.

Iontherapy in Ophthalmology.

Wirtz (*Klin. Monatsbl. f. Augenheilk.*, November, December, 1908) describes special electrodes which he has had constructed for the introduction of drugs by means of electrolysis (*iontherapy*, according to Leduc, *iontophoresis*, according to Frankenhäuser) in diseases of the eye. Applications are made to the cornea, and also to the conjunctiva and lid margins. Wirtz discusses the theory of the method at some length and this should be read in the original article. He has used it successfully, with solutions of copper and zinc, in conjunctival diseases, in trachoma and chronic catarrh, but does not think it can replace surgical operations when these are necessary. In acute and subacute catarrhs, without tissue changes, it is inferior to instillations of antiseptics and astringents, and is contraindicated. E. A. S.

The Treatment of Glaucoma Simplex by Miotics.

Koetzle (Dissertation, Tübingen, 1907, ref. in *Klin. Monatsbl. f. Augenheilk.*, September, 1908) in his dissertation gives the favorable results of the treatment of glaucoma simplex in the Tübingen clinic by the use of miotics. The dissertation is a fuller statement of the cases reported by Schleich in 1906. The standpoint of the Tübingen clinic is that the results of the medicinal treatment in comparison with the operative are so noteworthy that they demand further trial of the method. E. A. S.

The Optic Nerve Pathway in Sympathetic Ophthalmia.

Limbourg, Cologne (*Klin. Monatsbl. f. Augenheilk.*, October, 1908, p. 469), reported a case of typical sympathetic neurosis, 12 days after exenteration of the eyeball, which he designated as a sympathetic retrobulbar neuritis. He demonstrated the infiltrated central canal of the vitreous of a rabbit after inoculation with microörganisms, and also gave experimental proof of the pathway of infection along the optic nerves. Injection of bacteria into the vitreous of two rabbits caused meningitis. Bacteria were shown culturally on the surface of the brain, but not histologically. The blood vessels were not infected, but there was unusually marked infiltration of the optic nerve sheaths from the eye to the brain. E. A. S.

Experimental Investigation Upon Sympathetic Ophthalmia.

Parisotti (*Klin. Monatsbl. f. Augenheilk.*, June, 1908, p. 651; Report of French Oph. Soc.) has observed after injury to one eye in rabbits a consensual irritation of the other, which was accompanied by an increase of albumin in the aqueous humor of both eyes. This irritation, according to Parisotti, is a constant finding, especially after traumatism to the ciliary body, even when it cannot be detected clinically, and paves the way for all the other manifestations of sympathetic inflammation. He therefore takes the opposite view to Roemer, Wessely and others, who have found that such an increase of albumin in the second eye does not take place. E. A. S.

Concerning the Treatment of Sympathetic Inflammation of the Eye with Sodium Salicylate.

Widmark, J. (*Mitteilungen aus der Augenklinik des Carolin. Medico-chirurg. Instituts zu Stockholm*, 9 Heft, 1908.) Widmark adds to the seven cases previously reported by Lindahl, from the same clinic, five further ones of sympathetic inflammation, treated by large doses of sodium salicylate. Daily doses of from 4 to 6 g. were administered on an average, and in severe cases 8-9 g. In the 12 cases good results were secured. In one of the others there was a distinct influence upon the inflammatory process, but the outcome was atrophy of the eyeball. In three cases the drug had no effect; in two of these recovery was obtained by inunctions. In Widmark's clinic all traumatic ocular inflammations are treated with large doses of sodium salicylate, and it is believed that even when sympathetic inflammation is not prevented, its course is thereby made less malignant. E. A. S.

Concerning Lead Poisoning with Ocular Involvement.

Woersing (*Deutsche med. Wochenschr.*, 45, 1907, ref. in *Wochenschr. f. Ther. u. Hyg. des. Auges,* Feb. 6, 1908) reports a case of lead poisoning by the red oxide of lead, which was taken in mistake. No acute poisoning occurred, but after some time the picture of chronic lead intoxication. This salt of lead does not cause a local caustic action, but is soluble in the gastric juice, and is therefore slowly absorbed.

E. A. S.

Trachoma as Cause of Blindness in Russia.

Boczkowsky (*Klin. Monatsbl. f. Augenheilk.,* September, 1908, p. 344.) As a result of prolonged statistical studies, Boczkowsky comes to the conclusion that 25% of all cases of incurable blindness in Russia are due to trachoma. Women become blind more frequently than men, and foreigners more frequently than the native Russians. Blindness from trachoma is also seen in children. E. A. S.

A Case of Hydrophthalmos.

Bunge (*Klin. Monatsbl. f. Augenheilk.,* June, 1908, p. 643) reports a case of hydrophthalmos with detachment of the retina and subluxation of the lens. The patient gave the history that he had lost his sight suddenly from the jarring of his body, on jumping from a wagon to the ground, although Bunge had never seen a case in which detachment had resulted from a blow on the head, trunk or extremities. The iris showed minute ruptures of the sphincter, which he believes were due to the hydrophthalmos, as there had been no blow upon the eyeball.

In discussing the case, Schmidt-Rimpler (p. 644) showed a 27-year-old man, who had bilateral hydrophthalmos, with excavation of the optic papilla and vision of 5-15 in one eye and ½ in the other, after correction of the myopia. Sclerotomy had been done on one eye, because of increased tension. Bunge's case, although 38 years old, had a vision of 1/3—1/2 in the uninjured eye. These cases show, therefore, that adults are frequently seen who possess a comparatively good visual acuity, despite the fact that they suffer with congenital hydrophthalmos. This fact should receive more consideration than it usually does, in judging the results obtained by operation in juvenile hydrophthalmos. E. A. S.

Trachoma of the Tarsus.

Addario (*Progress. ottalm.*, III, p. 257; Ref. in *Klin. Monatsbl. f. Augenheilk.*, September, 1908, p. 344). Addario says that the changes in the tarsus in trachoma are at first inflammatory in character: increase of the connective tissue cells new formation of capillaries, and increase of the endothelial cells in the vessels. An encroachment of the specific trachomatous inflammation upon the tarsus from the conjunctiva, or a displacement of the tarsal glands by follicles, etc., *does not take place.* There is always a fine connective tissue layer between the conjunctiva and the tarsus. In the cicatricial stage, the new vessels and cells are again destroyed and atrophy and fatty degeneration of the tarsus, with disappearance of the glands occur. E. A. S.

Concerning the Action of Iodic Acid in Trachoma.

Schiele (*Klin. Monatsbl. f. Augenheilk.*, July, 1908, p. 96). Schiele recomends very warmly the use of applications of iodic acid (in pencil form) and subconjunctival injections of sodium iodate in trachoma, a method which he has repeatedly urged. He ascribes the effect to the nascent iodine which is formed. In discussing the subject before the St. Petersburg Ophthalmological Society, Blessig said that the results achieved in the St. Petersburg Eye Clinic by the use of the iodic acid pencil, both in fresh and old trachoma, should stimulate further experimental use of the remedy. The action of the cauterization upon the follicles, which are colored a peculiar yellowish gray, is very striking. E. A. S.

Concerning Influenzal Infections of the Eye.

Rosenhauch (*Klin. Monatsbl. f. Augenheilk.*, October) reports from the University clinic in Krakau six cases of ocular infection, due to the influenza bacillus. In two there was acute conjunctivitis of the new-born, blennorrheal in type; in one a subacute conjunctivitis in a three-months-old child; the fourth case was a subconjunctival abscess, the fifth a dendritic ulcer of the cornea, and the sixth an orbital abscess following empyema of the frontal sinus. The three conjunctival inflammations were primary, and unaccompanied by constitutional symptoms. E. A. S.

Contribution to the Action of the Pfeiffer Influenza Bacillus in the Eye.

Fischer, Th. (*Klin. Monatsbl. f. Augenheilk.*, October) reports from Axenfeld's clinic a case of panophthalmitis in a staphylomatous eye, from which a virulent influenza bacillus was cultivated. No lesion of the corneal epithelium was present, nor were the organisms found in the conjunctiva. Inoculation experiments with animals showed that the influenza bacillus, when introduced into the eye, especially into the vitreous, produced violent inflammation, whereby the organisms were found to increase, and were capable of cultivation some days after inoculation. Under these circumstances he believes the influenza bacillus must be considered as a possible cause of wound infections of the eye, e. g. after cataract extraction. E. A. S.

Concerning the Indications for the Operative Treatment of Trachoma.

Kuhnt (*Klin. Monatsbl. f. Augenheilk.*, October. p. 462) says that expression of the trachoma follicles is successful only when they have commenced to show softening, i. e., are passing into the second stage of the disease. In severely infected regions, reinfection is very common after the operation. He, therefore, urges excision of the transition fold of the conjunctiva, together with a strip of the tarsus. If properly performed it is without danger to the eye, and prevents the secondary changes in the cornea and distortion of the lids. If the latter are present they are most quickly cured by the operation. He recommends it when persistent medicinal treatment, galvanocaustic singeing of the granules, etc., show no tendency to bring about cure.

Grünert (Bremen) said in the discussion that with his material, among the emigrants, he was accustomed to use galvanocautery, which acted quickly and left comparatively little scar tissue, as the American authorities refused admission if scars were present. He had succeeded in arranging with the officials for admission of the cases in future, which showed no distortion of the eyelids. E. A. S.

Concerning Follicle Formation in Pannus in Trachoma.

Meyerhoff, M., Cairo (*Klin. Monatsbl. f. Augenheilk.*, October, 1908), describes in detail the formation of follicles and minute pits at the corneal limbus in pannus, which were seen by Herbert in India, and reported in 1904. He found the condition in about 50% of all cases of well marked pannus, but never in the absence of pannus. They appear after several months' existence of the trachoma, usually at the upper limbus, in the form first of small, yellowish red, translucent nodules, which are flattened on account of the tenseness of the pannus tissue. They vary in size from 0.2 to 2.5 mm., and in number from 1 to 35, usually separated by a space in which the vessels run. In the course of weeks, months or years, there is a gradual shrinking of the follicles and they become converted into the little pits, or depressions, by an analogous process to the cicatrization of the follicles in the lids. The pits finally may dissappear, or may become confluent, and form grooves, several millimeters long, which may occupy almost the entire upper limbus. He considers them a secondary condition, the epithelial involvement and the infiltrates in the avascular part of the cornea being the primary pathological formations, and believes they constitute a new proof that the corneal disease in trachoma is an infection, and not the result of mechanical irritation. E. A. S.

Results with a New Method of Credization of the Newborn in Institutions and Among Midwives.

HELLENDALL, Düsseldorf (*Klin. Monatsbl. f. Augenheilk.*, October, 1908, p. 470), in order to avoid decomposition and evaporation of the nitrate of silver solution used in the Credé method, advises that the solution be furnished in air-tight ampullae, which contain 0.5 cc. of a 1% solution. The solution is dropped by means of an ordinary eye dropper, the lower end of which is filled with a cotton filter. Only 10 drops are furnished, and as 5-6 are retained in the cotton filter, not more than two drops can be instilled into each eye. One thousand cases were observed. E. A. S.

Intraocular Hemorrhage and Sarcoma of the Chorioid.

REIS, WILH., Bohn (*Zeitsch. f. Augenheilkunde,* Band xx, Heft 4, October, 1908.) Since the valuable contribution of Ribbert, regarding chromatophoroma, and its special application to tumors of the uveal tract by Schieck, controversies regarding the histology and histogenesis of tumors springing from the chorioidal coat are at an end. The clinical aspects are, however, still very important. Hirschberg has recently revised the prognosis of sarcoma of the chorioid according to his rich and long experience.

The symptomatology of occult tumors has been enriched by the observation of pigment deposits on the iris and Descemet's membrane by Fehr, and a similar observation by Purtscher of a coffee-ground deposit in the angle of the anterior chamber.

Schieck observed the clinical picture of exudative plastic chorioiditis in a case of sarcoma of the chorioid.

The author has observed two cases of sarcoma of the chorioid in which there were simultaneous intraocular hemorrhages. Such a coincidence could lead to fatal error in diagnosis, and has not been noted by previous writers.

In the first case, occurring in a 59-year-old woman, in whom the right eye presented the appearance of hemorrhagic glaucoma, the iris was filled with enormously dilated veins, and showed numerous large fresh and old hemorrhages. The eye was enucleated, but not examined histologically until 3½ years later, following a request for information regarding this enucleation from a surgeon of the same clinic, who had removed from this patient a solitary melanosarcoma of the liver, of the size of a fist. The microscopic examination disclosed a large tumor of the chorioid.

The second case occurred in a 63-year-old man, who came for failing vision. The right eye presented a small, round, inactive pupil, which refused to dilate with atropine and cocaine. No view of the eyeground was obtainable, the lens being slightly opaque.

Transillumination showed an apparent tumor in the region directly behind the lens, spreading ringlike about the eye.

After enucleation the author was surprised to find that the mass was composed of a fresh, brownish red, coagulated mass of blood. However, in the posterior pole, out of range of a possible diagnosis, there was found a melanotic sarcoma of the chorioid of the size of a hazelnut. F. K.

Spontaneous Panophthalmitis.

Kummel, R., Erlangen (*Zeitschr. f. Augenheilkunde*, October, 1908, Band xx, Heft 4), describes a case occurring in a rachitic child, 11 months old. The child had been vaccinated 4 months previously, but no pustules remained at this site. She had, however, marked eczema from the pustules of which the author believes the infection had occurred by metastasis. Pure cultures of staphylococcus pyogenes albus were obtained from the conjunctival cul-de-sac. F. K.

Concerning Certain Disturbances in the Healing Process After Cataract Operations.

Peters, A., Rostock (*Zeitschrift für Augenheilk.*, October, 1908.) The first case reported by the author was one of keratitis bullosa, due to endothelial degeneration. The corneal incision was made too small for the large lens, making its extraction somewhat difficult. Striped keratitis resulted with non-reformation of the anterior chamber. Frequent crops of vesicles appeared on the cornea, resulting in opacity. After prolonged treatment, a vision of 5-12 resulted. The author explains the vesicle formation as a degeneration of Descemet's membrane, with "drusen" development, hastened by the traumatism of operation.

In a second series of cases a marked chemosis followed the operation and was associated with a marked swelling of the corneal wound, a striped and cloudy appearance of the cornea.

It was finally discovered that the cause of this series of mishaps was the use of an oxycyanide of mercury solution which had been made too strong by the nurse, and which additionally, was too alkaline. The author thinks that the alkalinity was the principal cause of the reaction.

A third disturbance noted by the author was *headache* after cataract extraction, which could not be explained by the condition of the eye. He frequently finds that this is due to a supraorbital neuralgia, which is relieved by acetanilid, etc.

F. K.

Dacryocystorhinostomy After the Method of Toti.

SCHIRMER, O., Strassburg (*Zeitschrift f. Augenheilkunde*, December, 1908, Band xx, Heft 6), performed this operation in six cases, in three of which there was a perfect cure of the dacryocystitis, with absence of stillicidium and lacrimation. In the other three cases there remained some lacrimation, though the blennorrhea of the sac had ceased. The operation consists in the making of a large opening through the lacrimal bone into the nose with a Gruenwald forceps and a counter opening in the lacrimal sac. A piece of iodoform gauze is passed through the opening into the nose, and the sac is returned to its original place. No attention is paid to the normal opening of the sac into the nose. The gauze is removed in one week, by way of the nose and a patulous opening into the middle meatus of the nose is established. Improvement in the technique will probably produce better results. F. K.

The Treatment of Serpiginous Ulcers of the Cornea by the Galvanocautery.

VASEK, EMIL, Prague (*Zeitschr. f. Augenheilkunde*, December, 1908, Band xx, Heft 6), believes that the general practitioner should be taught to send every case of serpiginous ulcer of the cornea into a hospital at once so that galvanocautery can be applied. Dependence on antiseptic washes and ointments is precarious. Early application of the galvanocautery does no harm and will prevent spreading of the disease, cutting short its duration. Thorough cauterization is required when the infiltration involves all the layers of the cornea or the limbus. When the hypopyon is thick and moderate in amount, no puncture of the anterior chamber should be made. Puncture of the anterior chamber with the galvanocautery offers no advantage over the knife. Suppurating lacrimal sacs should be extirpated at once. The patient should be kept quiet after extensive cauterization of the cornea, since perforation has occurred in the third week. F. K.

Ocular Metastasis Following Furunculosis of the Neck.

Pagenstecher, Adolph H., Wiesbaden (*Zeitschrift f. Augenh.*, November, 1908, Band xx, Heft 5), states that it is very rare that an abscess below the conjunctiva will penetrate the sclera and cause panophthalmitis. He reports a case in a 51-year-old woman, who had many furuncles on her neck, which, in spite of incision, showed a tendency to spread. Two weeks later there was slight protrusion and immobility of the eyeball, with redness and swelling of the lids, and pus in the anterior chamber. Two weeks after this, the conjunctiva on the temporal side was projected forward. The cornea was clear, aqueous humor cloudy and a gray reflex was obtained from the fundus. The following day after the removal of the bandage pus was exuding from a fistulous opening at the side of the former conjunctival projection. A sound introduced into this opening entered the globe. Staphylococci were found in great numbers. The eye soon became quiet. Five months later the lids were greatly depressed as in anophthalmos, though the eyeball in its anterior half presented a good appearance. The pupil was occluded and retraction of the sclera was apparent at the side of the fistula. Diagnosis then was phthisis bulbi posterior, due to metastasis. F. K.

Optic Nerve Disease Caused by Pregnancy.

Reuss, V., Vienna (*Wiener klin. Woch.*, July 30, 1908, No. 31). The author reports an interesting case of primary optic nerve atrophy following repeated pregnancies. The patient first consulted him in 1872, complaining of poor vision, particularly pronounced in the left eye. She was then 35 years old, but had already been pregnant 14 times. Three years previously she had sought the advice of an oculist for failing vision in O. S., but was told that treatment would be of no avail. Under strychnine injections and potassium iodide, vision in O. S. was practically restored to normal, in O. D. to reading J. No. 14.

Two subsequent pregnancies resulted in further visual impairment with temporal hemianopsia. A spontaneous delivery in the one instance and an artificial abortion in the other, was followed each time by considerable improvement of vision. Vision in O. S. was finally lost entrely, but in O. D. vision improved, enabling the patient in her 70th year to write a letter to the author, containing a favorable report as to her general and ocular condition.

While it seems improbable that the physiological enlargement of the pituitary body occurring in the pregnant state (Erdheim, Stumme) can, under normal conditions, exert pressure on the chiasm, Reuss suggests that in this case there might have been a shallow sella turcica lodging a pituitary body abnormally large because of the patient's active sexual life. This would explain the temporal hemianopsia and the stationary character of the affection during the non-pregnant state. He considers such a hypothesis more plausible than one attributing the condition to a mysterious autointoxication. A syphilitic infection could not be substantiated.

A. C. S.

On the Instillation of Eye Drops as a Contribution to Decreasing the Dangers of the Conjunctival Reaction.

HANS, Limburg (*Die ophth. Klinik.*, Nos. 10 and 11, 1909). Lest the Wolf-Eisner, Calmette reaction should truly result in an ophthalmo-reaction, the writer devoted particular attention to the manner of instillation. He also made a careful study of the technique of conjunctival instillations in general, a subject which the profession has never considered seriously.

The following points in the technique are discussed by him:

1. The position of the patient's head.

3. The direction of the patient's gaze (depending on whether the cornea is to be avoided or not. In making the Calmette test in the right eye, the head should be turned backwards and to the left: the right eye being directed up and out, the tuberculin being applied only to the region of the caruncle.)

3. The position of the surgeon in relation to the patient (variable).

4. The separation of the lids and their retraction from the

globe in order to form a conjunctival pocket or produce maximal eversion of the lower canaliculus.

5. The removal of excess and the withdrawal of medicaments (tuberculin) after the contact has been accomplished.

6. The concentration of the effect of local applications by means of the introduction into conjunctival pockets, of absorbent cotton containing the drug.

7. The order to be followed in the instillation of several medicaments. (Oily to follow watery, etc.)

8. The best eye dropper. Two photographic copies are included, showing the position of patient and surgeon during a tuberculin and during an atropine instillation. A. C. S.

Contribution to the Tuberculin Cure of Ocular Tuberculosis.

KRAEMER, Stuttgart (*Die ophth. Klinik.,* Jan. 5, 1908, No. 1). The success attending the tuberculin therapy of ocular tuberculosis has largely contributed to its present recognition as the best curative method in the treatment of tuberculosis. The course of treatment should be a systematic one and should only terminate after it has been shown that a general cure has been establishd. The cure of a peripheral lesion should, therefore, never lead to a discontinuance of the tuberculin treatment. To illustrate how a case should be handled, he reports in full a case of ocular tuberculosis associated with internal tuberculosis. For detailed information, the original article should be consulted. A. C. S.

Concerning the Education of the Blind and Weaksighted of the Better Classes.

WEISS, JR., Gmünd (*Die oph. Klinik.,* Dec. 20, 1907, No. 24), refers to those who do not receive the advantages of institution training. The instruction of such cases demands: 1. Rigid individualization—the method of instruction varying with each particular case. 2. Instruction should be conducted along with seeing individuals.

General methods of instruction are cited. He emphasizes the importance of systematic visual training in cases of defective sight, especially when the lesion is in the retina or optic nerve. By exercising systematically what little vision there is left, much can be accomplished, particularly in young subjects. A. C. S.

On the Treatment of Ophthalmia Neonatorum with Bovine Serum.

GILBERT, Munich (*Münch. med. Woch.*, July 28, 1908). The serum was employed in eight cases of gonoblennorrhea; several of the hospital cases were brought to a favorable termination within two or three weeks without the use of any other medicaments. The treatment consists in flushing the conjunctiva with bovine serum every two hours. In most of the cases treated ambulatorily by this method, however, silver nitrate had to be used in conjunction during the latter part of the treatment.

The serum irrigations stimulate the phagocytic properties of the leucocytes, as was demonstrated in microscopical preparations. If kept on ice the serum will retain its efficacy at least twenty-four hours. He recommends the serum as a substitute for the usual antiseptic eye solutions, but believes it would be too venturesome to rely solely on the serum, particularly in dispensary cases. A. C. S.

Roemer's Immunizing Method (Injections of Pneumococcic Cultures and Pneumococcic Serum) in Cases of Ulcus Serpens.

REIS, Lemberg (*Wiener klin. Woch.*, July 2, 1908, No. 27). The treatment of ulcus serpens by the combined method of immunization, as advocated by Roemer, comprises:

1. The injection into the arm muscles of 1 c. c. of a dead pneumococcic culture—*active immunization.*

2. The injection about 24 hours later of 10 c. c. pneumococcic serum into the lower abdominal region—*passive immunization.*

In obstinate cases the serum injection is repeated.

This treatment was employed by Reis in fourteen cases of ulcus serpens in 1906 and in three cases in 1907, only those cases being selected which produced the pneumococcus in pure culture or in predominating numbers. The serum and culture were obtained from E. Merck, Darmstadt. The effect on the ulcer was generally favorable and visual acuity was considerably benefited. Atropine, heat and occasionally dionin and instillations of serum were used in conjunction. Galvanocautery was also frequently resorted to.

According to Roemer the best results are obtained in the first stages of corneal infection, in cases treated not later than the fourth day, with ulcers not exceeding 3 mm. in diameter.

Whether the curative influence depends upon active or passive immunization still remains in doubt, although a case studied by Reis in 1906 seemed to indicate that the injection of the culture was the more important part of the treatment. Such a decided improvement followed the injection of the cultures in this case that it convinced him at least that the theory of active immunization by means of dead pneumococcic cultures had a rational basis.

Constitutional reaction is not necessary; 1 c. c. suffices.

In 1907, eight cases were treated by culture injections alone and conjunctival insufflations of iodoform. These also did well.

The prophylactic value of active immunization can best be determined by the general practitioners, as these are usually consulted first. The culture costs considerably less than the serum. A. C. S.

Affections of the Lacrimal Canal and Their Treatment.

Enslin, Fürth (*Muench. med. Woch.*, June 23, 1908, No. 25). Enslin believes that if ophthalmologists would consider the physiological mechanism of tear conduction, fewer mistakes in treatment would occur. Thus only the first portion of the lower canaliculus should be slit to enable the action of the orbicularis to direct the tears towards the nose. Where ectropion exists with relaxation of the tissues, it should be corrected by operation. In high strictures of the canal, the results of pressure on the sac are often negative.

The patency of the canal is best determined by syringing through the lower canaliculus, the stricture being localized by the probe. Rhinological examination is essential in every case and nasal treatment if indicated, although he believes there are few cases which respond solely to nasal treatment.

Extirpation of the sac means the severance of physiological relations. The after-results are often disappointing. In two cases he removed the palpebral lacrimal gland without affording the patients any relief.

The conservative treatment which he is inclined to favor wherever possible, consists in irrigating the canal with a solution of suprarenin-cocaine (1 cc. 3% cocaine solution to 5 drops of suprarenin 1-1000); the use of small probes, probing being preceded by the introduction of the suprarenin-cocaine solution.

He performs the Axenfeld operation for removal of the sac, only he makes a smaller incision, uses a Mueller's speculum and sponges with cotton pledgets soaked in sublimate solution. The operation is indicated in atony, hydrops, trachoma and tuberculosis of the sac, where aseptic ocular operations are contemplated, when patients are unable to or refuse to submit to probing and when there have been previous attacks of phlegmonous dacryocystitis. A. C. S.

Concerning Peripheral Ectasia and Atrophy of the Cornea.

FLEISCHER (*Die ophth. Klinik,* May 20 and June 5, 1903. Nos. 10 and 11). Fleischer describes six cases observed during the past three years. The descriptions closely resemble observations made by Frank, Lauber, Seefelder, Ischreyt, Terrien, Fuchs, Ruprecht and Früchte.

The disease characterizes itself by a more or less slightly opaque, a more or less broad, ectatic or gutter-like, sunken zone adjoining the corneo-scleral junction and gradually merging into it; separated from the center of the cornea by a somewhat irregular, wavy, more opaque line containing yellowish-white masses, probably fat deposits according to Seefelder. Peripherally from this line which terminates with characteristic abruptness in the lateral corneo-scleral borders, the transparency of the cornea increases with the amount of thinning (ectasia) the peripheral portions of the iris always remaining in view.

The vascularization of the affected part differs from the vascularization of peripheral inflammations of the cornea in that the capillary loops of the corneo-scleral junction appear to be advanced more regularly towards the center. Moreover superficial and deep vessels occur, which anastomose with each other.

The circulation in these can be observed, especially well and may be somewhat sluggish. Young adults are particularly susceptible, five of the six patients being of this class which is in accord with the findings of Fuchs, Seefelder, Terrien and Früchte. Fleischer considers it primarily a degeneration (unlike that however observed in arcus senilis) the inflammatory symptoms being secondary. The disease may progress quite rapidly and seriously affect vision, an inverse astigmatism generally being produced. The etiology is obscure: two of his patients had circulatory complications. Fuchs believes that the local vascular development plays an important part in the pathogenesis of this affection. A. C. S.

The Dangers of the Ophthalmo Reaction.

POLLAND, Graz (*Wiener klin. Woch.*, July 9, 1908, No. 28). Polland observed serious ocular sequelae in three patients subjected to the Calmette test at the Graz dermatological clinic.

In one an obstinate conjunctivitis was induced: in a second, corneal ulceration and perforation followed, reducing a previously normal vision to 1/10 and in a third case a marginal ulcer occurred. He considers the Calmette test only justifiable after other diagnostic methods have failed or when much depends upon the diagnosis. A. C. S.

Contribution to Deutschmann's Serum Therapy.

ZIMMERMANN, W. (*Die ophth. Klinik*, July 5, 1908, No. 13). Zimmermann used the serum in eleven cases, including cases of serpent ulcer, infections following traumatism, post operative infection and sympathetic ophthalmia. The clinical history of each case is recorded. The results obtained lead him to assert that in cases of pneumococcic ulcer, iritis and post operative infections, the Deutschmann serum is of undoubted value if employed reasonably early. It should receive consideration as a prophylactic measure in perforating wounds of the globe and preliminary to cataract extration in decrepit individuals. Harmful constitutional effects never occurred. Good results were also obtained by v. Hippel in a series of cases.

A. C. S.

Concerning a Material Improvement of My Serum.

DEUTSCHMANN, Hamburg (*Muench. med. Woch.*, July 21, 1908, No. 29). He refers to a case of inflammatory exophthalmos reported by Schwalbach. One eye had succumbed to the same affection several months previously in spite of operative interference. In the fellow eye the injection of Deutschmann's serum was followed by immediate improvement and under repeated injections the eye returned to normal very quickly without operation. Two recurrences easily controlled by the serum compelled him to attribute the curative effect to the serum.

The constitutional and local disturbances sometimes provoked by serum, to which Schwalbach calls attention, do not ensue if the serum as modified recently by Enoch is employed. This serum, designated as Deutschmann's serum E, has been used by the author with brilliant success in grave cases of iritis and hypopyon keratitis. Equally good was the result obtained in a case of metastatic ophthalmia. Treatment was begun with the old serum, but an erythema occurring after the second injection, Deutschmann's serum E was used exclusively. The case in many respects resembled Schwalbach's.

The modified serum is not only as efficacious as the old serum, but is without toxic properties and more concentrated. Therapeutic success depends upon the employment of large doses, 4 cc. of the double concentrated solution being an average dose. He urges a trial of the serum in other branches of medicine.

A. C. S.

The Theories Regarding the Etiology of Senile Cataract.

POSSEK, Graz (*Wiener klin. Woch.*, August 20, 1908, No. 34), refers to the various theories which have been advanced. By reason of his investigations concerning tetany artificially induced by removal of the parathyroids, and observations made by Roemer and others, Possek is of the opinion that senile cataract is probably dependent upon disturbances of certain blood glands which inhibit the normal systematic abstraction of autotoxic substances, thereby favoring the presence of such lenticular poisons in the blood stream.

Disturbances of the normal ciliary circulation and perhaps also degenerative processes in the ciliary epithelium impair the retentiveness of the ocular secretory apparatus enabling poisonous products to enter the nutritive fluids of the lens. The capsule epithelium succumbs first, permitting further progress of the degenerative process. Whether these autotoxic substances resemble cytotoxins or other chemical substances, such as uric acid, etc., it is as yet impossible to say. Much is in favor of Roemer's hypothesis. Changes in concentration of aqueous, lenticular clefts, etc., he considers secondary manifestations in the development of senile cataract. A. C. S.

The Dangers of the Ophthalmo Reaction and How to Avoid Them.

Wolff-Eisner, Berlin (*Wiener klin. Woch.*, August 13, 1908). The conjunctival test should only be attempted with a freshly prepared 1% tuberculin solution, the tuberculin being obtained from the serum laboratory of Ruete-Enoch, Hamburg.

Unfavorable sequelae are due to the employment of unsuitable preparations, especially the so-called test preparations. Reinstillations, particularly where a positive result has already been obtained, are not only dangerous, but of no diagnostic value. Instillations should not be made in positive or suspicious cases of local ocular tuberculosis, and in eyes with a previous scrofulous history the test is absolutely contraindicated.

Observing these rules Wolff-Eisner failed to see any harmful effects from 3000 reactions. A. C. S.

Concerning Two Fatal Cases Consecutive to Orbital Traumatism.

Scheuermann, Stuttgart (*Die ophth. Klinik,* Nos. 14 and 15, 1908). The first occurred in a student who during saber practice received a lacerated wound of the lower lid, penetrating the orbit. He immediately fainted and gradually sank into a condition of deep coma and shock, death ensuing in three hours.

Post-mortem Examination.—Extensive tuberculous involvement of one lung and pleura. No brain lesion. Death attributed to shock made less tolerable by the pulmonary condition and general lowered vitality.

The second case occurred in a three-year-old infant after a wound of the conjunctiva, produced by the pointed end of a lead pencil. Within a few days all local symptoms had disappeared. About nine days later the upper lid again became swollen and the child complained of headache. Vomiting, fever and general malaise rapidly followed and the diagnosis of basilar meningitis was made. Finally, pulsating exophthalmos supervened which, however, receded just before death.

Post-mortem Examination.—Right orbital abscess; V-shaped perforation in orbital plate of frontal bone; abscess of right frontal lobe, which had ruptured into right lateral ventricle, accounting for disappearance of exophthalmos and subsequent death. The pus was found to contain streptococci in pure culture.

The author believes that wounds near the orbit, if infection at the time of injury is suspected, should be carefully probed and the wound canal kept open by tampon or rubber drain.

A. C. S.

ABSTRACTS FROM ITALIAN OPHTHALMIC LITERATURE.

BY

V. L. RALA, M. D.,

PROVIDENCE, R. I.

Electrolytic Epilation in Partial Trichiasis.

BOTTINI, FILIPPO (*Annali Di Ottalmologia,* Fasc., 1-2, 1908). Trichiasis, as is well known, is due to cicatricial contraction of the conjunctiva, of the margins of the lids and of the tarsus, contractions caused by trachoma, ciliary blepharitis, injuries, etc. Many have been the operative procedures from antiquity, the most useful in partial trichiasis being electrolytic epilation introduced by Michel. The electrical apparatus must give a constant current of five milliamperes and have a milliamperemeter, a large disk covered with leather on the positive pole and a fine needle on the negative. The needle is introduced in the follicle of the deviated eyelash and the positive pole applied on the temple. A froth appears at the surface of the needle, which indicates disintegration of the papilla. It has been proved that it is not necessary to introduce the needle exactly in the follicles, the electrolytic action being felt even when it penetrates in the tissues near the implantation of the lashes. A study of many cases in the Eye-Clinic of the medical school of Pisa shows that this treatment is the most successful in partial trichiasis, and Bottini recommends it highly in consideration specially of the fact that any other operation to correct the defect would be inappropriate, not knowing to what degree the deviation of the lashes will reach, the trachomatous process not having finished yet.

Two Cases of Spontaneous Rupture of the Eye Globe.

BIALETTI, DR. (*Annali Di Ottalmologia,* Fasc., 1-2, 1908). Spontaneous rupture of the eye-globe is a very rare affection and when it happens is the consequence of hemorrhagic glaucoma. It was thought that the old age accompanied by arteriosclerosis was the principal cause, although no signs of degeneration of the vascular system could be found in the two cases of the author. The first case was an old woman of 70 years of age who had glaucoma absolutum in the right eye and chronic irritative glaucoma in the left. Three years after the latter had been operated (iridectomy) the eye-globe ruptured all of a sudden on the sclerocorneal junction, where the scar, resulting from the previous operation, showed itself. The second case is a patient of 75 years of age, on whom 14 years ago a sclero-iridectomy had been performed. A large rupture occluded by a big coagulum of blood was found by Dr. Bialetti, and here also became evident that the old scar due to the incision of the sclera had given away under the influence of the enormous intraocular pressure. This case differs from the first one, which we may call really spontaneous, in this, that a purulent infection, having made its appearance, contributed greatly to diminish the resistance of the cicatricial tissue and produce the rupture of the eye.

Pathological Anatomy of Scleritis and its Complications.

Bietti, Amilcare (*Annali Di Ottalmologia*, Fasc., 3-4-5, 1908). There are two forms of deep scleritis, one characterized by separate nodules, the most common, and another recently studied, very rare. This latter has been called gelatinous or anular scleritis, the inflammation being all around the cornea like a band and deep in the tissues, its course is chronic and malignant, the sight is destroyed through infiltration of the cornea, and the only effective remedy is enucleation. For this reason, although the affection is very rare, the opportunity to study the pathological alterations of the sclera has been more favorable than in the other forms in which very rarely the eye can be subjected to the microscopical examination. Some writers think that the sclera is secondarily affected and that the primary disease is in the uveal tract, while others are of contrary opinion. In regard to the etiology the idea has been expressed that the affection is of tubercular nature. The case which the author reports is that of a woman of 46 years of age who had been suffering from this peculiar inflammation of the sclera for two years and no remedy had been of any avail. The cornea became infiltrated, the sight very much blurred and the pain so unbearable that enucleation was advised and accepted by the patient. The microscopic examination of the eye globe revealed a deep inflammatory infiltration of the sclera all around the cornea with slight alterations of the iris and ciliary body and the chorioidea absolutely normal. The isolated infiltrations in the iris and the ciliary body had all the appearances of tubercles, and although the specific bacilli were never found Dr. Bietti is inclined to consider this form of scleritis a regular tuberculosis of the sclera for which he recommends tuberculin treatment.

Internal Ulcer of the Cornea in Parenchymatous Keratitis.

BIETTI, AMILCARE (*Annali Di Ottalmologia*, Fasc., 3-4-5, 1908). Cases of destruction of the endothelium of the cornea and Descemet membrane have been reported in parenchymatous keratitis. The absence of endothelium on the posterior surface of the cornea can be detected with a solution of fluorescin which has been used until now exclusively to put in evidence small abrasions of the epithelium. As to how these internal ulcers of the cornea are produced there is divergence of opinions. Some think that the toxins in the aqueous humor have a deleterious effect on the posterior surface of the cornea, others are of the opinion that the exudates from the iris by their contact produce destruction of the endothelium and Descemet membrane. The inflammation of the parenchyma of the cornea would follow the lesion of continuity of its inner layers, and consequently, according to some writers, the affection is secondary to iritis and cyclitis. In the author's case, a patient of 60 years of age, the trouble began two years previous to the first examination, very likely as an iritis, and it produced such a destruction of the sight and such an unbearable pain that it was deemed advisable to enucleate the eye. The microscopic examination of the same in sections revealed no alterations of the epithelium, Bowman's membrane and outer part of the parenchyma, but intense infiltration of the deep layers, specially in the center or the cornea, with a remarkable internal ulcer due to destruction of the Descemet membrane. Exudates were visible in the anterior chamber and several nodules on the surface of the iris. The author made a diagnosis of a tubercular affection of the iris and ciliary body, a diagnosis confirmed by the tuberculin reaction inoculated under the skin during life and the presence of specific bacilli. The parenchymatous inflammation, according to Dr. Bietti, may be the consequence of toxins in the aqueous, of the contact of exudates from the iris on the posterior surface of the cornea, or may be primary in the deep layers of this membrane with propagation toward the inner parts, and consecutive destruction of the Descemet membrane. The complication of internal ulcer of the cornea with parenchymatous keratitis has been considered by different writers as a characteristic of hereditary syphilis.

The present case proves that this assertion is not absolutely true, the tuberculous nature of the affection being beyond any doubt, as the microscopic examination has shown.

A New Surgical Treatment of Trachoma in Regard Specially to Pannus of the Cornea.

Addario, C. (Read before the XIX Congress of the Italian Ophthalmological Association, held in Parma, 1-4 October, 1907). Trachoma has been considered till now by the majority of authors as a rough surface of the conjunctiva capable of exercising a traumatic action from which the so-called pannus of the cornea arises. The treatment of this affection has been directed toward the rendering smooth of this rough surface, to avoid friction on the cornea. The modern researches consider trachoma as an hyperplasia of the conjunctiva and that the alterations of the cornea (pannus) are not the result of a traumatic action, but a propagation of the trachomatous affection from the bulbar conjunctiva to the cornea. All the mechanical means (curettage, grattage, etc.) which have been used in recent times, are rather injurious, favoring that cicatricial contraction which every surgeon ought to prevent. The complication of the cornea is frequent during the formative stage when the papillae are rich in capillaries and the conjunctiva very soft, and very rare in the cicatricial stage. This fact contradicts the traumatic origin of corneal pannus. On the other hand in vernal catarrh of the conjunctiva where the papillae become hard we never observe any alterations of the cornea. The ulcers in pannus which were considered the consequence of friction of the rough surface of the tarsal conjunctiva on the cornea are, according to the recent studies of Rahlman and Addario, the expression of a destruction of the epithelium of the lymphoid elements independently of any traumatic action. From what has been said, specially that trachoma does not constitute roughness of the cornea, it appears evident to the author that the conception of rendering the conjunctiva smooth is based on false premises (curettage, grattage, etc.).

Acute trachoma, trachoma accompanied by slight alterations of the tarsal conjunctiva, the follicular variety of the fornices can disappear without leaving sensible traces, but that grave form which is accompanied by remarkable lymphoid infiltration of the tarsal conjunctiva and pannus of the cornea is followed by cicatricial contraction with the production of entropion, trichiasis, blepharophimosis, etc. The radical treatment proposed by Heisrath and modified by Kuhnt has the object of shortening the disease and preventing cicatricial contraction of the tarsal conjunctiva and pannus of the cornea with all its consequences. This radical treatment, obtained by partial excision of the conjunctiva of the upper fornix and partial tarsectomy, has been criticised as producing lagophthalmus, a thing which will never happen if the operation is properly done.

Dr. Addario has added to partial tarsectomy transplantation of the mucous membrane of the upper fornix of the conjunctiva, and the results in 100 cases of trachoma have been most satisfactory. He excises the middle third of the tarsal diseased conjunctiva, then the upper third of the tarsus, and by separating the conjunctiva toward the fornix he transplants this with three sutures to fill up the gape obtained by the excision of the tarsal conjunctiva. With this method, according to the author, the pannus disappears, ulcers heal up quickly, and conditions of the remaining conjunctiva improve.

On My Operative Procedure for Entropion and Trichiasis of the Upper Lid.

Angelucci, Prof. Arnaldo. For the last 20 years the author has used exclusively this operation with the most satisfactory results, the relapse so frequent following other methods being very rare. There is nothing original in it, as Prof. Angelucci candidly confesses, but the merit consists in having taken some of the best features from other methods and uniting them in a harmonious whole. The incision and excision of the skin of the lid he takes from Jaesche-Arlt operation, that of a strip of muscle from Anagnostakis and Hotz and from Snellen the incision of the tarsal cartilage, which he passes through with the conjunctiva. The author gives an important role to the orbicular muscle in the production of entropion considering the distortion of the tarsal cartilage, which has become atrophic, more as the consequence of the contraction of the muscle than of the cicatricial tissue of trachoma. The diminution of the bulk of the orbicularis is consequently of the utmost importance for the success of an entropion operation, according to these views.

Prof. Angelucci speaks of two ways of operating, an old one and a new, the latter being exclusively used by him at present. The old operation is performed as follows: After having everted the lid this is held by two fixation forceps, one at each extremity, in such a manner that the inner surface is well exposed. With a cataract knife an incision from one extremity to the other, at two millimeters from the margin of the lid, is made through the entire thickness, beginning at the conjunctival side and terminating on the skin. The lid is made to return to its natural position, the margins of the external wound are enlarged, a piece of skin, not so large as in Jaesche-Arlt operation, is excised, a strip of muscle in correspondence of the upper margin of the wound is cut, taken away, and sutures finally employed to unite the upper with the lower flap of the lid. The new process which is nothing else than a modification of the one already described, is performed with a Snellen lid forceps. After closing this latter, an incision is made, beginning on the skin at two mm. from the ciliary margin with a small knife, including the skin, muscle and the tarsal cartilage and conjunctiva. The rest of the operation resembles exactly the previous one.

Some Complications Following Cataract Extraction.

Puccioni, Prof. G. (*Clinica Oculistica,* February, 1908). Among the complications after cataract operation which agitate the mind of the surgeon for several days, the author speaks of slow cicatrization of the corneal wound and expulsive hemorrhage. General conditions, as albuminuria, diabetes, irregular incision of the cornea, hypersecretion, blepharospasm have by different authors been thought to produce tardy cicatrization of the corneal wound. While this condition of the cornea seems to favor the entrance of the pathogenic germs of the conjunctiva into the eye, the infection of the inner part of the eye bulb is very rarely observed. This is explained by the elimination of these germs by the aqueous humor which washes them out. Slow cicatrization of the wound after cataract extraction is observed more frequently in simple extraction than in extraction with iridectomy. This probably is due to the diminished secretion of the aqueous after the section of the iris. The other complication, the expulsive hemorrhage, takes place either immediately after the operation or few days after, and is spontaneous or secondary to efforts made during the healing period of the cornea. Some writers consider this hemorrhage as the consequence of a sudden separation of the vitreous from the chorioidea, while the most plausible cause is an arteriosclerosis of the uveal tract. Before performing a cataract operation, it is advisable to carefully examine the heart, the vascular system and the tension of the eye, and if there is any doubt about the results, an iridectomy may be performed in advance, or if one eye has been lost from hemorrhage, instead of a regular extraction a reclination may be substituted.

An Easy and Sure Method for the Extirpation of the Lacrimal Sac.

Scimemi, Prof. E., of the Royal University of Messina (*Clinica Oculistica,* March, 1908). The extirpation of the lacrimal sac has been recommended by high authorities as the only means to cure chronic dacryocystitis, for which sounding and antiseptic injection have been used without avail. The affection not only is tedious for its long duration, but dangerous to the integrity of the eye, the secretion of the sac being a good culture medium for the development of pathogenic germs (streptococcus, staphylococcus, .pneumococcus, diplococcus, pneumobacillus, diplobacillus of Morax-Axenfeld, bacillus of Koch-Weeks). It has been proposed, also, as a preventive measure in case a patient cannot be kept under constant observation and a lesion of the cornea exists which is apt to produce infection at any moment. The extirpation of the lacrimal sac in itself does not produce any inconvenience to the patient, as it would appear. The irritation of the conjunctiva and the mucous membrane of the sac is reflected on the lacrimal gland in chronic dacryocystitis, and the consequence is that an hypersecretion of this gland is produced which is most annoying to the patient. The removal of the diseased sac by removing this source of irritation consequently stops the overflow of tears. From the experiments of Tscherno-Schwarts, it has been further proved that the normal mucosa of the sac has some influence on the corresponding lacrimal gland, so that after the excision of the sac the said gland becomes somewhat atrophied.

In extirpating the sac, to facilitate the removal of the mucosa, the author injects through the canaliculi or through the skin into the sac a solution of 1% pyoctanin blue, by which means an intense coloration of the mucosa becomes apparent, and there is no possibility of leaving any part of it, a fact which would produce suppuration. He begins the incision a little above the internal palpebral ligament, without injuring the same, goes down and outward for 3 centimeters, describing a line with the concavity toward the temple, separates the sac from the lacrimal groove on the inner side, then on the external side from the soft tissues, being careful not to injure the internal rectus, afterward on the upper part, working behind the internal palp. ligament, and finally, taking a good hold of the separated tissues with a fixation forceps, the attachment of the sac to the canaliculi above and the mucosa of the nasal canal below are separated. Sutures are applied to the external wound, which unites ordinarily by first intention.

The author performs extirpation of the sac in lacrimal fistula, in chronic purulent dacryocystitis, in blennorrhea of the sac with dilation of the same, in mucocele, in old stenosis with corneal ulcer, or when an operation must be performed on an eye bulb, in simple stenosis which has resisted to all the other means of treatment.

Chips of Stone Imbedded in the Iris—Experimental and Clinical Researches.

Speciale, Dr. (*Clinica Oculistica,* April, 1908). Foreign bodies imbedded in the iris are rather of rare occurrence, the parenchyma of this membrane being such as to render their retention very difficult. An exception to this rule must be made for chips of stone. These particles may remain in the iris for many years without giving any irritation whatever, or after a long lapse of time they may give rise to inflammation with occlusion of the pupil and formation of pus in the anterior chamber. This peculiarity of the iris in regard to chips of stone has attracted the attention of the writer of the present article. To find out if it is the chemical composition, their physical property or the pathogenic germs they carry the cause of the iritis excited by their presence, he prepared particles of different stones and by incising the cornea of rabbits, forced them with instruments adapted to the purpose in the parenchyma of the iris. The constant result in these experiments was that the foreign body remained in the iris without exciting any inflammation. Another series of chips of the same kind rendered septic in cultures of staphylococcus were imbedded in a similar way in the iris with results quite different from the previous ones. The incision of the cornea became infiltrated with pus, ulcerated, pus appeared in the anterior chamber, the pupil occluded. In spite of all this the cornea healed with the formation of a leucoma, the pus disappeared from the inner part of the eye, a fact which speaks against the infection of pus germs of the iris, from which panophthalmitis and destruction of the eye would have resulted. Cultures made with pus extracted from the anterior chamber in several of his cases of chips of stone in the iris were negative.

According to the author, the cause of the inflammation is not in the foreign body itself, but outside of the same. The general conditions of the patient constitute the principal factor. When these are normal and the constitution of the blood perfect, the iris does not react to the stimulus brought by these particles, and consequently they can remain imbedded in its parenchyma for several years without giving rise to any inflammation. Syphilis, diabetes, tuberculosis, by lowering the vitality of the tissues of the body, render the iris liable to inflammation from the least cause. With this hypothesis we can explain the iritis and the general irritation of the eye which manifest themselves many years after small pieces of stone have remained innocuous in the parenchyma of the iris.

Diagnosis and Treatment of Tuberculosis of the Iris.

D'Alessandro, Dr. L. (*Clinica Oculistica*, May-June, 1908). The author reports a case of tuberculosis of the iris in a girl of 13 years old, in whom pericorneal injection, photophobia, discoloration of the iris, synechiae, appearance of several little tumors on its surface first separated, then coalescing and making one mass, were observed. Sight was reduced to perception of light. The diagnosis made by Dr. D'Alessandro was confirmed by Prof. Angelucci, who advised a prompt enucleation of the affected eye. The parents absolutely refused this operation, although it was explained to them that the danger of infecting the other organs was great. The author, as a last resource, practiced 43 subcutaneous injections of tuberculin with the most astonishing results. The growth from the first began to decrease, until it completely disappeared, an ectasia of the sclera, due evidently to tubercle growth of the ciliary body, became invisible, and a scar took the place of the tubercular formation on the iris. After several months all the traces of inflammation had gone. That the diagnosis of tuberculosis of the iris was exact is proved by the mercurial treatment which resulted negatively, consequently excluding any suspicion of syphilis, the local reaction after the injection of tuberculin, and the general condition of the patient. The anatomical and bacteriological examination of the tubercules could not be performed.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

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ST. LOUIS.

M. W. Frederick, M. D.
SAN FRANCISCO.

Llewellyn Williamson, M. D.,
ST. LOUIS.

Indications for Subconjunctival Injections.

Darrier (*La Clinique Ophthalmologique*, Nov. 19, 1908) recommends the use of a 2% saline solution subconjunctivally in slight, infectious keratitides, acute corneal infiltrations, and in the later stages of keratitis parenchymatosa. Old leucomata and calcareous deposits are best treated by weekly injections of lithium benzoate. Hydrarg. cyanat. (1:5000) combined with 2% saline or with acoin is indicated in old corneal ulcers with hypopyon. In episcleritis and rheumatic iritis, ½% sodium salicylate injections are indicated, while potassium iodide in the same strength may be used in vitreal opacities and scleral gummata. Sodium iodide in 1:1000 strength is painless and more active; it is very good in secondary glaucoma, quickly reducing the tension. In affections of tubercular origin, injections of 2% guaiacol cacodyl. are practically painless and very beneficial. Furthermore, all kinds of sera and antitoxines can be used subconjunctivally as well as per os. C. L.

Cysticercus Subretinals.

Gallemaerts (*La Clinique de Bruxelles*, No. 50, 1908) presented to the Académie Royale de Medicine de Belgique a butcher whom he had successfully operated. It lay downward and outward, under the retina of the left eye. The field of vision was restricted to a segment downward and outward, but this was enlarged immediately after the operation.

Before the operation the blood count showed 7.5% eosinophiles, which was reduced to 0.5% afterwards. This eosinophilia is of diagnostic importance, as it occurs in other parasitic infections, and may lead to the proper diagnosis of a subretinal detachment, before it has advanced too far

C. L.

A New Operation for Pterygium.

CABANNES (*La Clinique Ophthalmologique,* No. 23, 1908) describes an operation for pterygium, which he has used in about forty cases. Believing that the tendency of a pterygium to return is due to a cicatricial traction caused by the removal of too much of the new-growth, he excises little or none of it, but covers its position by healthy conjunctiva.

The operation consists of 3 steps.

(1) Detachment of the head and dissection of the body to its middle portion. While an assistant holds the pterygium with a forceps, drawing it towards the caruncle, the cornea is cleared with a sharp curette. The eye is then drawn outward, so that the position of the pterygium is plainly seen. The latter contracts into the internal canthus, where it can be ignored.

(2) The conjunctiva is dissected above and below to the vertical meridian at the limbus, and is cut vertically for a distance of ½-1 cm. at both places. The conjunctival flap is loosened, and thus two somewhat quadrilateral flaps are formed, an upper and a lower, which are easily movable and lie in the former position of the pterygium.

(3) The edges of the flap are sewed with two sutures, the one lying next to the cornea passing through the episcleral tissue, and these are removed in 6-7 days. The pterygium lying near the caruncle has disappeared. C. L.

SOCIETY PROCEEDINGS.

SECTION ON OPHTHALMOLOGY.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Meeting November 19, 1908. Dr. Howard F. Hansell, Chairman, presiding:

A Case of Obstetric Injury of the Cornea Observed in an Adult.

Dr. Chance related the clinical history of a case of *Obstetric Injury of the Cornea* observed as a late result in an adult. There was a fine Y-shaped fiber extending in a vertical direction down the whole length of the cornea at the nasal side, and two short oblique ones at the temporal, in the posterior layers of the cornea. These were evidently the scars of healed ruptures. The production of fibrin had been so excessive that the fibers projected like cords into the aqueous chamber. The patient's birth had been a most difficult one and was accomplished only by instrumental delivery. Her head had been so forcibly compressed that for many days it remained misshaped and for a long time the eyeballs protruded from their sockets. Over each temple deep loop-shaped scars are still visible.

The "Nasalen Reflex Bogenstreif" of Weiss in its Relation to Myopic Distention.

Dr. B. Alex. Randall said he was moved by two recent cases, to ask renewed study to this phenomenon, as to which he had seen little notice since he wrote of it twenty years ago. A boy, aged fifteen years, who five years ago showed under atropine $H=0.5$, returned complaining of dim sight in the schoolroom and now had $M=1.5$ under a mydriatic. To the nasal side of each disk was a well-marked curvilinear retinal reflection, shimmering yet constant, and apparently in front of the retinal level. At the temporal margin there was a broadened scleral ring, a crescent of pigment disturbance, and an outer crescent of beginning absorption. The porus was shelving outward, but sharp cut toward the prominent nasal portion of the disk; and on the left side there was the pigment crescent at the nasal border which Nagel designated "supratraction of the choroid." The vessels were little distorted, but contributed to the picture of "drag" pointed out by Thomson in 1875. Both of his parents have low H., and no great notice would have been taken of the reflex if seen five years ago; but it would have been recorded and some oversight maintained.

A boy, aged ten years, coming a few days later showed the reflex and has been carefully measured and correction given for his low H., and will be watched to forestall if possible a like change in him—his father and others of the family being already myopic. This has long been his rule in dealing with all instances of this phenomenon.

While the appearance has not been met with any such frequency as Weiss reported (38 per cent. of 1094 school-children's eyes) and is rarely if ever due to the detachment of the vitreous which he assumed, it merits more attention, Dimmer being perhaps the only other who has written of it. As the latter has demonstrated, it is a real inverted image of the illuminating mirror formed by reflection from the concave surface where the distorted prominence of the nerve head sinks to the retinal level. This distortion is almost more characteristic than the conus or other signs of stretching at the posterior pole; and the resulting retinal reflex is not only quite characteristic and fairly conspicuous, but seems generally to mark a pathological rather than any merely anomalous configuration.

Dr. Hansell said he had noted the reflex quite commonly since the publication of Dr. Randall's paper, usually in moderate myopia, but not in hyperopia or high myopia. He always considered it a sign of probable stretching of the eyeball.

A Case of Outgrowth in the Vitreous, Probaby Arising in the Optic Nerve.

The patient, a girl, aged sixteen years, was presented by Dr. H. F. Hansell. She had been practically blind in the left eye since one year of age, the blindness having been attributed by her parents to a fall by which the left supraorbital region was injured. It is probable, however, that the condition is congenital. The growth consists of a mass of fibrous tissue, springing from the optic nerve sheath, projecting forward a few millimeters into the vitreous. A section was pearly white and non-vascular, and the remainder less white and vascular. Several bands of white tissue similar to that of the mass radiated from its summit and were lost in the meshes of the retina. Two of them partly enveloped blood vessels, and the rest were independent of vessels.

Dr. Harlan thought that as this structure seemed to be membranous, was well forward in the vitreous, which was otherwise normal, and was in all probability congenital, it might have some connection with a persistent hyaloid canal.

Dr. Randall said that the history of the case recalled that of a child whose similar head injury had been followed by optic nerve atrophy and divergence, but at that time no outgrowth. As to the anomaly, which was very much like one seen with Dimmer in Vienna (*Archives of Ophthalmology*, 1884) and one of Dr. Risley's, he could not associate it clearly with Cloquet's canal or the hyaloid artery, but regarded it as the result of postnatal inflammation as in one or more of his own cases cited by Dr. Hansell.

Dr. Zentmayer said that some years ago he showed before the Section a patient having a pyriform white, vascular, glistening connective-tissue mass in advance of the retina extending from the temporal half of the disk out toward the fovea. It was about one and one-half times the size of the disk and had two streamers, one of which came forward to the posterior capsule of the lens bearing out the assumption, in this case, that the mass was an anomaly of the sheath of the hyaloid artery.

Dr. Risley mentioned the case of outgrowth in the vitreous, in association with the formation of new vessels, which was reported by Marple in New York several years ago at the meeting of the American Ophthalmological Society. He had seen a similar case in the practice of Dr. Simeon Snell.

Dr. Hansell, in closing, said he believed the outgrowth to be congenital and not inflammatory. The mass occasionally swings aside and shows the nerve head, and then it is evident that no inflammatory change is present. He, therefore, considered it a vascularized outgrowth from the nerve sheath.

Membranous Conjunctivitis, with Systemic Complications.

Dr. Howard F. Hansell showed a case of *Membranous Conjunctivitis, with Systemic Complications.* The patient was a woman, aged twenty-seven years, who was admitted to the Philadelphia General Hospital, May 9, and discharged June 2, 1908, suffering with gonorrheal vaginitis, gangrenous stomatitis, and membranous conjunctivitis. Gonococci were found in the vaginal secretion, pseudodiphtheritic bacteria in the necrotic masses removed from the buccal mucous membrane, gonococci and a few streptococci in the purulent secretion of the conjunctivas. In addition to the usual local treatment for the three affections, she received daily injections of diphtheria antitoxin. The effect of the injections was surprisingly favorable. Improvement in the disease of the mouth and eyes was so rapid that the membranes entirely disappeared, and the patient had practically recovered in a week's time.

Dr. Hansell deprecated the common use of the descriptive adjective "membranous" as designating a separate class of conjunctival inflammations. A membrane may form in any form of inflammation, irrespective of the cause, provided the inflammation is of high grade.

Dr. L. D. Frescoln, Assistant Chief Resident Physician of the Philadelphia General Hospital (on invitation), said that he had had the opportunity of following Dr. Hansell's case, which was especially interesting from the bacteriological viewpoint. As Dr. Hansell had stated, there was a very extensive false membrane, which at first obscured the eyeball, in a woman with gonorrheal vaginitis and gangrenous tonsillitis. Laboratory examination of the membrane showed no Klebs-Loeffler bacilli, and no case of diphtheria developed in the ward. There had been a number of cases of Vincent's angina in the hospital, a stomatitis with bleeding of the gums, and grayish-white patches involving the mouth, tonsils and ears, but examination in this case of the infected tonsils failed to show the fusiform bacilli and spirilla of Vincent. It was decided to use injections of diphtheria antitoxin, and the patient showed great improvement in a few days, and a rapid disappearance of the membrane.

Dr. Harlan said that recently good results had been reported by one of the French surgeons in the use of diphtheria antitoxin for various infections, notably those with the pneumococcus.

Dr. Randall said that antitoxin had been used with benefit in many conditions, as for instance, ozena. He detailed the history of a case of conjunctivitis which developed in a surgeon's eye after an operation upon a child with croup. No membrane was present, but after the discovery of the Klebs-Loeffler bacillus in the ears of the child at autopsy, injections of antitoxin were given to the surgeon and the conjunctivitis promptly disappeared. Horse serum in itself may be of value in the treatment of various conditions. It was, of course, a well-established fact that all membranous formations were not diphtheritic.

Dr. S. D. Risley said it was often difficult to determine the significance of membranous conjunctivitis. He recalled the case of a child at the Wills Hospital which presented the characteristics of diphtheritic conjunctivitis, and before admitting it to the wards he sought the advice of Dr. Harlan and Dr. Norris. The case was admitted and a portion of the membrane and discharge sent to the laboratory. In two days the child was far on the road to recovery, the membrane having entirely disappeared before the laboratory report was received, which disclosed it to be diphtheritic. He had seen repeatedly, in illy nourished children and in feeble patients, a purulent discharge disappear and a membrane covering the entire tarsal conjunctiva rapidly form under the too continuous or too prolonged application of iced compresses, and the membrane disappear in turn when heat was substituted for the cold.

Keratitis with Nasal Etiology.

Dr. J. Norman Risley reported two cases of *Keratitis with Abnormal. Nasal Conditions as Probable Etiological Factors.* The symptoms in both were similar. A low-grade inflammation of the epithelium and deeper layers of the cornea, slight ciliary injection, no pain, but lacrimation and photophobia, which seemed to be the chief cause of discomfort. Both cases were of long duration, and persisted in spite of local and constitutional treatment until the nasal conditions were discovered and treated.

In Case I, a robust woman, with excellent family history, the corneal condition had come on insidiously, with increasingly blurred vision and lacrimation and had persisted without much change for eight months. Examination showed a nest of infiltrated spots in the lower temporal quadrant of the cornea in the deeper layers, and the epithelium swollen and absent in places. There was a slight ciliary injection, with photophobia and profuse lacrimation. Examination of the nostril on the left side revealed a large polypus blocking the whole passage and a polypoid enlargement of the inferior and middle turbinates. The polypus was removed, the usual treatment for the nasal condition was instituted and the treatment for the corneal condition was continued, with the result of a complete cure in about three weeks. This patient at the time of consultation was wearing a concave spherocylinder over each eye, which under a mydriatic gave place to a convex spherocylinder. Dr. Risley said that the wearing of this erroneous correcting glass was a constant source of irritation; but that the obstruction to the exit of the tears caused by the presence of the polypus was probably the more direct cause of the keratitis.

In Case II, the patient, a lady, aged sixty-eight years, was pale, shrunken, and emaciated, and seemed old for her years. She came for treatment June 22, 1908, stating that her left eye had been sore for the past six months. The vision was reduced to fingers at one foot; the tension was normal, the cornea was foggy through its deeper layers and looked sodden and lifeless. The epithelium was swollen and in places raised or absent; the pupil small and adherent. There was slight photophobia and lacrimation. This condition had prevailed in spite of local and constitutional treatment for the past six months, without much change.

Examination of the nostrils showed the presence of a large rhinolith on the left side, completely blocking the nasal passage on that side and causing a deflection of the septum to the right, narrowing the right nostril. This rhinolith was removed after considerable difficulty in two parts: one measuring 20 mm. and the other 55 mm. in circumference. Local treatment for the corneal condition was instituted, general tonics given, and the patient returned to the care of her local physician, who reported three weeks ago that the eye was entirely well.

Sarcoma of the Ciliary Body.

Dr. George S. Crampton showed a patient, a woman, aged forty-five years, with a *Probable Sarcoma of the Ciliary Body.* The growth was situated in the lower temporal quadrant of the right eye, and was readily seen through the pupil, on oblique illumination. It was of a pale red color, and had dragged the root of the iris backward in its growth, thereby causing an iridodialysis and a displacement of the lens. The tumor had given no symptoms and was discovered accidentally, as the woman had come for treatment of an abscess of the eyelid. For the last seven years she had been comfortable with a high concave glass, the vision at the time of ordering the glass having been 6-15 in each eye. She now counts fingers at one meter with the affected eye.

Marked Ectasia of the Sclera, Simulating Tumor.

Dr. Crampton related the history of the patient, a man, aged sixty-two years. The eyeballs have always been elongated transversely. He was struck in the left eye by a snowball three years ago, after which its sight was lost for three days, and he has had occasional attacks of pain in this eye ever since.

The present attack was of a few days' duration and was accompanied by agonizing pain in the eye and temple. Tension varied from normal to plus two, and the cornea was insensitive and hazy. Vision was nil in the affected eye, while a + 4.50 sphere and a + 1.25 cylinder axis 90 gave 6-15 vision in the other eye.

A rapid increase in the transverse diameter of the globe terminated in a tumor-like protrusion the size of a small lima bean on the temporal side in the equatorial region. The sclera was extremely thinned at each lateral pole, and over the protrusion was as thin as gold-beater's skin. The appearance was so much like that of a tumor that it was decided to enucleate the blind and painful eyeball. A histological report will be made later.

Dr. Harlan said this case was a good illustration of the value of transillumination. The projection was as hard and incompressible as bone and they had no doubt that it was a growth, only questioning if it arose in the sclerotic or the chorioid. The transilluminator, which did not happen to be at hand, would have settled the question at once.

There is a similar thinning and commencing lateral bulging of the sclerotic in the other eye which is a typically turnip-shaped ball expanded laterally and shortened antero-posteriorly. There is a hypermetropia of 4.50 and a normal disk. It is a question whether anything can be done to check the progress of the disease in this eye. An iridectomy might be in order, although there is not much, if any, increased tension.

Dr. S. D. Risley was much interested in the specimen shown. The large ectasia of the globe certainly simulated that produced by a malignant intra-ocular growth. It is probable that transillumination of the globe before enucleation might have proved an aid in establishing the presence or absence of such a growth. He had in his collection a highly distended myopic ball, which before excision had presented one very large tumor-like prominence and a smaller one at the opposite side. After section of the ball for mounting, the prominences proved to be ectasiae, and presented on the concave or inner surface large atrophic areas in the chorioid and the sclera stretched to the thinness of a sheet of paper. He thought iridectomy would be a wise procedure in such eyes. If not absolutely hard they are relatively so, and a peripheral iridectomy would favor excretion through Schlemm's canal, as in buphthalmus.

Dr. Hansell was afraid if iridectomy was done, inflammation might be set up in the iris, and he felt that Heine's operation of cyclodialysis would be safer, and not cause inflammation. He had done the operation in one case of glaucoma. He had had a case of ectasia of the sclera in his own practice which involved the ciliary body. An attack of acute glaucoma with intense pain necessitated enucleation. The same condition began in the fellow eye, but was checked by the administration of antirheumatic remedies.

Chorioretinitis in Nephritis and Diabetes.

Dr. Wm. T. Shoemaker showed two cases. The first was a patient who had diabetes mellitus for nine years, and nephritis two years. The retinal changes were mixed, partaking of the supposed characteristics of both albuminuric and diabetic retinitis, following more closely the former. The second was in a case of diabetes, the urine showing also a trace of albumin. Here the exudations tended to form a ring around the macula, resembling the appearance seen in retinitis circinata. Hemorrhages were quite plentiful in the first case, and were both round and flame-shaped. In the second case they were very small and few in number. In both cases the changes in the disk and vessels were moderate—some blurring of the disk margins, with moderate distention of the veins. Dr. Shoemaker discussed the points usually given in differentiating the two conditions, and thought the second case in the absence of diabetes might be looked upon as a case of retinitis circinata.

Meeting December 17, 1908. Dr. Howard F. Hansell, Chairman, presiding.

Case of Opticociliary Vein.

Dr. William T. Shoemaker reported a case of *Opticociliary Vein* in a male Hebrew. Such cases are of interest simply on account of the infrequency with which this anomaly is said to occur. Ten cases of true congenital opticociliary vessel have been reported, but in the opinion of Dr. Shoemaker, many more have probably been seen, but passed on account of their insignificance. Of these ten, two cases were arteries and eight cases veins. The same condition may be acquired in the course of papillitis, glaucoma, etc., representing then a dilatation of capillary twigs previously too small for observation.

Dr. Shoemaker regarded his case as an errant chorioidal vein, which, instead of terminating at the sheath of the nerve, as does the chorioido-vaginal or posterior vortex vein, passed on to the central vessels of the retina. As it would seem to have no connection with the ciliary veins, the name opticochorioidal was suggested as better describing this class of anomaly.

Concerning the Disappearance of the Coloration in Siderosis Bulbi.

Dr. de Schweinitz related the case history of a man aged twenty-two years, into whose eye a small piece of iron had been driven one year before he came under observation, and who presented in typical manner the appearances of siderosis bulbi, the iris being of a deep rust color, while beneath the capsule of the lens there were a number of yellowish-brown spots, which have been so often referred to as pathognomonic of the presence of a metal foreign body within the eyeball. *X*-ray examination demonstrated the presence of a foreign body 9 mm. back of the center of the cornea, 10 mm. below the horizontal plane, and 3 mm. to the nasal side of the vertical plane. It was easily removed through a suitably placed scleral incision by the point of a Sweet magnet placed at the lips of the wound. The body weighed 1-100 of a grain. Three and one-half months after the operation there had been almost complete disappearance of the coloration of the iris, so that it had practically assumed the color of the iris upon the opposite side. The spots upon the capsule of the lens were no longer noticeable, but a few spots in the cornea, the nature of which was not quite clear, could still be detected. The vitreous was still filled with opacities, as it had been at the original examination, there was a detachment of the lower half of the retina, but the upper half of it could now be seen to be crossed by numerous pigmented striae, arranged exactly in the order of the so-called angioid streaks of the retina.

Dr. de Schweinitz referred to other examples of the disappearance of siderosis bulbi, as they have been reported by Kipp, Vossius, and Hirschberg.

Dr. Sweet said he had had the opportunity of seeing the case and had observed the disappearance of the staining of the tissues. He did not recall having seen this occur in any of the other foreign body cases which he had watched.

Dr. Hansell said the disappearance of the stain would depend upon the nature of the coloring matter. Blood pigment might be absorbed quickly, but if it was due to the deposit of oxide of iron in the tissues, the removal of the foreign body would seem to have little effect in the absorption of the rust stain. In many cases a foreign body has remained in the eye for years without causing siderosis.

Dr. Ziegler reported a case of siderosis, with cataractous lens, in which the lens was successfully removed, but no foreign body could be found. In two other cases of siderosis under his care, there had been no disappearance of the stain, after removal of the foreign bodies.

Dr. de Schweinitz, in closing the discussion, related the case of a young man at present under his care, who, one year before he was examined, had been struck in the eye presumably by a small piece of metal. This produced no inconvenience at the time, and nothing was done about the eye until quite recently, when cataract began to form and there was then well-marked siderosis. *X*-ray examination revealed the presence of a foreign body, not within the eyeball, but just outside of the scleral coat, and not in contact with it. It would therefore seem that in these instances and in others like it the source of pigment was more likely to have been from the blood than from the foreign body itself. He thought that his own case was particularly interesting in the rapid manner in which the discoloration had disappeared.

Epithelioma of the Eyelid of Somewhat Unusual Form and Development, Together with the Results of Operative and X-ray Treatment.

Dr. de Schweinitz demonstrated a patient, aged eighty years, from whom he had removed an epithelioma of the following description, namely: It began at the lower margin of the right eyelid and completely covered this structure, extended through and above the brow to the forehead, being 6 cm. in length and nearly 4 cm. in width. It was cake-shaped, surrounded by a hard rim of cutaneous tissue, and exhibited both macroscopically and microscopically many areas of degeneration. In other respects its microscopic characteristics were those of an ordinary epithelioma. It was dissected freely from its bed, and after granulation tissue had begun to form on the raw surface left after its removal, the patient was submitted to *X*-ray treatment, with the result that within a month there was nearly complete cicatrization of the area, with the exception of a nodule near the center, and only a slight ectropion and drawing upward of the previously extensively diseased upper lid. Somewhat later and after *X*-ray treatment had been stopped a tendency to recurrence was evident. Dr. de Schweinitz emphasized again, as he had on a previous occasion, the importance of removal of as much of the epitheliomatous growth as is possible under these conditions before the treatment with the *X*-rays is begun, and referred to another patient in whom this treatment had been equally successful and whom he had previously demonstrated before the Section.

Recurrent Pterygium Treated by Removal and the Implantation of a Thiersch Graft.

Dr. de Schweinitz demonstrated a patient from whose left eye he had removed a very large recurrent pterygium, 2.5 cm. in length and nearly 3 cm. in breadth at its base, which extended from the center of the pupil to the plica, and in a triangular fold downward to the inner surface of the lower lid in the form of a symblepharon. In the center of this pterygium there was a large clear cyst. The whole mass was removed and the raw surface covered with a Thiersch graft, which became firmly attached at the end of forty-eight hours, and has remained perfectly in situ, permitting free movement of the eyeball and eyelid, which previously had been bound by this pseudopterygial mass. He commended this form of treatment, as he had practiced it on several other occasions, and referred to the previous work of Hotz and Gifford in this same connection.

Dr. Zentmayer said that he wished to take this opportunity to state that in the case of epithelioma of the lid which he had showed a year ago, where healing had taken place under the use of chlorate of potash, some weeks later there occurred a breaking down of the scar, and, as he believed that it would progress, he had advised extirpation. Since that he had not been able to follow the case.

Dr. Keith, resident physician at the Philadelphia Hospital, said, in reference to the epithelioma case, that its appearance at first was that of a chalazion of the upper eyelid. This he had incised and curetted while the patient was in the out-ward department one year ago. He had noted that the contents did not have the usual appearance, and later the nodule increased in size, until it presented the character described by Dr. de Schweinitz. The *X*-ray treatment was temporarily discontinued after four or five applications because of the conjunctivitis produced, but had been resumed. Dr. Frescoln, chief resident physician of the hospital, thought, from his experience, that the growth could be completely cured by continued use of the *X*-rays.

Dr. Hosmer said that the tumor proved to be a squamous-celled epithelioma, with evidences of inflammation throughout its stroma, and destruction of the peripheral cells of many of the in-dipping epithelial processes. Pressure on the growth probably caused the extrusion of some of the cores, composed of horny cells, and gave the appearance of comedones, as Dr. de Schweinitz had described.

Dr. Sweet had seen a number of instances of recurrence of epithelioma after the *X*-rays had caused perfect healing of the superficial tissues. He thought that in many cases this could be explained by the failure to employ rays of sufficient penetrability to affect the deeper carcinomatous cells, the treatment acting upon the superficial disease and retarding its growth, and stimulating healing of the skin.

Herpes Zoster Ophthalmicus with Involvement of the Cornea and with Oculomotor Paresis.

Dr. Chance observed these symptoms in a lady of advanced years whose habits of life were unusually active. (Published in full page 221.)

Dr. Harlan said that motor paralysis was a rare complication in this disease. He had seen quite a number of cases, but the motor nerves were involved in only one. In this there was nearly complete external ophthalmoplegia.

Dr. Zentmayer said especial interest attaches to the etiology of herpes zoster ophthalmicus complicated by oculomotor paresis. He thought there were strong reasons for accepting the view that it is an acute infectious disease—the immunity resulting from an attack, the specific course which it usually runs, and its occurrence at times in epidemic form. If this view is correct, it is likely that the palsies have the same origin as those which occur in diphtheria—a toxic action upon either the nuclei, the Gasserian ganglion, or the peripheral nerve. An interesting point is the rarity with which the external rectus is involved and the fact that the levator rarely escapes. As to frequency of this complication in herpes zoster he could recall but two references in American literature (Stieren and Sulzer) since the report of his own case in 1902.

Angioid Streaks in the Retina.

Dr. Wm. Zentmayer exhibited a case of *Angioid Streaks in the Retina.* The patient was an apparently healthy man, aged thirty-three years. The history contained nothing of etiological moment. He had come for treatment because of sudden failing sight in the right eye. Corrected V. of O. D. = 5/X; O. R. = 5/V. There was a typical dendriform ulcer of the cornea in O. D. Ophthalmoscopic examination showed in both eyes a system of ramifying and anastomosing pigment bands varying in size from one to three times the diameter of a retinal vein and in color from black through chocolate-brown to red, extending pretty much over the entire fundus. In general they extend from a similar band surrounding the disk and course and taper toward the periphery of the fundus, where there are extensive retinochorioidal changes with a somewhat mottled arrangement of free pigment and whitish, retinal epithelium. In the right eye, below the broad band which runs to the macular region, there is a horizontal extravasation of blood. In the left eye a band running toward the nasal fundus is interrupted by a small circular area of superficially disturbed retinochorioidal epithelium, giving the appearance of a rupture with extravasation of blood and subsequent absorption; the band continues beyond this in an attenuated size.

The general examination and the examination of the blood and urine were negative.

Dr. de Schweinitz briefly referred to the cases of angioid streaks in the retina which he himself had published some years ago, and all of which occurred in members of the same family. Further etiological factors, however, were not elicited. He had always found it difficult to understand how these peculiar branching lines could be produced by hemorrhages disposed in a linear-like manner throughout the fundus, and was inclined, since he had read Mr. Lister's paper, to agree with his view of the pathology of these cases.

Relation Between Correcting Lens and Vision Under Cycloplegia.

Dr. Thorington presented a paper with the following thesis: *The Visual Acuity under Definite Conditions is an Index of the Strength of the Necessary Spheric Lens (plus or minus) which will Give a Vision of 6/6 or More.* These definite conditions are: (1) The ability of the eye to read 6/6; (2) the ciliary muscle at rest; (3) the astigmatism corrected with the necessary cylinder; and (4) the visual acuity noted in fractions of one-tenth (1/10). Two test cards of "metric test letters" and two clock-dial, astigmatic charts were shown. All letters and lines were constructed to the tangent of the angle of five minutes. According to practical experience and by careful calculation it was found that each one-tenth visual acuity represented one-quarter of a diopter sphere (plus or minus), so that when the patient's vision was represented by so many tenths it would be necessary to give him enough additional tenths (in quarter spheres) to equal ten-tenths, or normal. For example, having six-tenths vision, the patient would require four-tenths more, or a one diopter sphere, to give him normal vision. No provision, in this method of coming promptly to the spheric correction, was made for the twelve one-hundreths diopter sphere, and these small numbers must be used when the vision has been brought to 6/6. This "Metric Letter" testing is not a substitute for retinoscopy, but has many interesting values, as will be found by a careful study of the paper which will be published in *The Annals for July*.

Dr. Zentmayer said in reference to the letters employed that he thought that they who objected to the use of such letters as A, X, K, and other similar letters, where a certain part of the letter subtended a smaller angle than the component strokes of the letter, were right if they were contending for a scientific estimation of the visual acuity. For instance, in the letter A the apex of the enclosed triangle where the vertical strokes meet subtends an increasingly smaller visual angle than the stroke of the letter.

In Dr. Oliver's test card such letters have been excluded. For a scientific estimation of the visual acuity he believes Landolt's optotypes and similar characters are the most valuable, but not the most practical.

He said that Dr. Wallace had taught his students an approximate method for determining the amount of spherical required in an eye under the influence of a mydriatic with its astigmatism corrected by the fractional reduction of V, but it had not the accuracy of Dr. Thorington's ingenious method.

Dr. Turner said he placed most reliance, in his work, upon the use of retinoscopy. A general discussion followed, which was participated in by Drs. de Schweinitz, Hansell, and Thorington, as to the best form of test letters, methods used in refraction, and the advantages offered by the method of confirmation, suggested by Dr. Thorington.

Foreign Body Localization.

Dr. William M. Sweet exhibited a young man who came to the Methodist Hospital, in the service of Dr. Philip H. Moore, complaining of failing vision. Discoloration of the iris indicated a possible foreign body in the eye, and the x-rays showed a piece of metal, as thin as a fine needle, and 16 mm. long, resting vertically in the vitreous, with the lower end embedded in the chorioid at a point 4 mm. in front of the equator. A scar on the upper lid indicated the point of entrance of the foreign body, the man recalling a slight injury at this situation six months previously. Dr. Sweet considered the case of interest as showing the value of X-ray localization, since the size of the entrance wound gave no indication of the length of the body, and without this knowledge any attempt to extract the metal with a strong magnet would have probably resulted in the loss of the eye. The position of the body, as shown by the x-rays, with one end embedded in the structures at the bottom of the globe, indicated that extraction must be made through an opening in the upper portion of the sclera, in order to release the end of the metal caught in the chorioid.

Meeting January 21, 1909. Dr. Howard F. Hansell, Chairman, presiding.

Tubercle of the Chorioid.

Dr. Wm. Campbell Posey exhibited a case of *Intra-ocular Neoplasm*, probably a solitary tubercle of the chorioid, in a man aged twenty-nine years. The right eye had been inflamed for four weeks. Examination showed a small swelling in the sclera just anterior to the equator down and in, between the insertion of the rectus internus and rectus inferior muscles. There was slight ciliary injection, but the scleral vessels were markedly distended. The cornea was hazy, being the seat of a pronounced Descemetitis. The vitreous was also hazy, but a large yellowish white mass the size of half a small pea could be plainly seen with the ophthalmoscope, down and in, corresponding to the external swelling in the sclera. Tension was decidedly elevated and the pupil perceptibly larger than its fellow.

A careful physical examination was negative regarding tuberculosis elsewhere. Local treatment was administered, and 1/500 mg. of tuberculin administered hypodermically. A slight febrile reaction followed, but no local reaction was manifested. Dr. Posey considered the case to be an instance of solitary tubercle of the chorioid and said that it was not unlike one reported by him in 1904 before the American Ophthalmological Society, which had been regarded as one of gumma of the chorioid, but which upon microscopic examination was found to be solitary chorioidal tubercle.

Palsy of Levator from Frontal Sinusitis.

Dr. Posey also exhibited a young colored girl who had developed almost complete palsy of the right levator palpebrarum as a consequence of a frontal sinusitis of the same side. The ptosis had followed severe neuralgic pain in the right supra-orbital and frontal region, and was coincident with the discharge of a mucopurulent secretion from the right nostril. Examination revealed marked tenderness in the right supra-orbital region, with pain on tapping the forehead. The muscles of the eyeball were unaffected and the motions of the globe were unrestricted. Dr. George B. Wood reported pus exuding from the region of the frontal duct on the right side. Cleansing treatment was instituted, and was followed by a copious discharge of pus from the nose, and a rapid amelioration in the pain and in the degree of ptosis. Dr. Posey attributed the paretic condition of the muscle to a direct involvement of the muscle itself, as it lay in close apposition with the floor of the sinus, an involvement of the nerve supply of the muscle being excluded by the absence of involvement of the ethmoidal or sphenoidal cavities.

Glaucomatous Excavations Due to Syphilis of the Optic Nerves.

A third case of deep glaucomatous excavations in a colored woman, aged thirty-three years, was also exhibited by Dr. Posey. Vision had failed gradually in each eye since the birth of a child four years previously. No menstruation had occurred since that time, though the patient was otherwise apparently healthy. The anterior segments of the eye were free from glaucomatous symptoms and tension was but little elevated, but both excavations were very deep and embraced the entire head of both nerves. There was marked perivasculitis of the retinal vessels, and the retina in the neighborhood of the disks showed signs of degeneration. Corrected vision equalled 2/60 in each eye. The fields were much contracted, that of the right eye being reduced to a small temporal segment, while that of the left had suffered a large loss in its nasal half. Although a syphilitic history was unobtainable, Dr. Posey was inclined to view the case as one of syphilis of the optic nerves. He had seen several similar cases, usually he thought, in colored subjects, and with generally but one eye affected, in which the nerve was atrophic and a large deep excavation present, quite out of proportion to the degree of intra-ocular pressure present. He thought the excavations arose as a consequence of softening of the nerve and blocking up of the posterior lymph passages of the eye from uveitis, by syphilis or other toxic agents, by means of which the lamina cribrosa gave way under the intra-ocular tension. Such cases were not to be regarded as in any sense instances of essential glaucoma, but rather as examples of the effect of tension upon the posterior segment of the eye as a consequence of the changes just referred to. He thought that treatment would be of no avail, as the anterior segments of the globe being apparently unaffected, any attempt to open the infiltration angle in the anterior chamber by either miotics or iridectomy would be futile.

Dr. Randall said that Dr. Posey's third case looked like one of very deep physiological cup, modified by optic nerve atrophy, possibly from hemorrhage rather than tension. Empirically he had tried dionin in such cases with distinct gain.

Dr. Ziegler said that the low tension suggested deep physiological cupping with atrophy of the nerve. If, however, the fields demonstrated glaucoma, he thought the posterior segment of the eye was chiefly involved and posterior sclerotomy was indicated.

Postneuritic Optic Atrophy in Syringomyelia.

Dr. Edward A. Shumway showed a case of *Syringomyelia, with Postneuritic Optic Atrophy, and Congenital Cataracts.* The patient was a young woman, aged twenty-six years, and the first symptoms of the disease had appeared eight years previously. The eyes became gradually blind three years ago. Ophthalmoscopic examination showed postneuritic optic atrophy; both eyes presented congenital posterior polar cataract and unusually high degree of atrophy of the iris in the left eye, from secondary glaucoma. Dr. Shumway spoke of the great rarity of postneuritic atrophy in syringomyelia, and said its most probable cause was internal hydrocephalus. Bulbar symptoms were present, as shown by hemiatrophy of the tongue, and its deviation toward the atrophic side, and these, with paresis of the external rectus muscle of the right eye, pointed to high extension of the cavity formation beyond the level of the medulla. There was also well-marked hemiatrophy of the face, which he considered the result of involvement of the fifth nerve, rather than as a lesion of the cervical sympathetic, which is usually given as the explanation. The lenticular opacities were to be regarded as a rare coincidence, and similar to those in a case reported by Schlesinger.

Dr. Weisenburg stated that his attention was first called to this case by the peculiar deformity of the hands. He had observed in many cases of syringomyelia that the contracture of the upper limbs was typically claw-like and further examination demonstrated the usual sensory disturbances of syringomyelia. From the neurological standpoint the case is very interesting, because there is, besides the usual motor and sensory symptoms in the upper and lower limbs and chest, involvement of a number of the cranial nerves with the peculiar ocular changes described by Dr. Shumway. In most cases of syringomyelia the cavity extends only as far as the upper portion of the spinal cord, but in this case it is evident that there is involvement also of the medulla and pons. The facial hemiatrophy is unusual and is probably due to disturbance of the fifth nerve and not to sympathetic changes, as is the opinion of many. To substantiate this view there are disturbances of sensation on the side of the hemiatrophy. This is the fourth case in which optic atrophy, secondary to choked disk, has been reported. The previous cases were those of Saxer, Bullard and Thomas and Weisenburg and Thorington. In two a necropsy was obtained and internal hydrocephalus found, and it is probable that the changes found in this patient are due to the same cause.

Chorioidal Hemorrhage Following Operations on the Globe.

Dr. Wm. Campbell Posey read the histories of two cases, one an instance of massive explosive hemorrhage from the chorioid, occurring in an Irishman, aged sixty-eight years, from whom a cataract had been removed from the other eye some years previously without complication. The hemorrhage followed immediately after the removal of the lens and without apparent cause, and continued for several days despite local and general remedial measures. The eye was finally lost from phthisis bulbi. The second case was an instance of transudation of blood under the chorioid as a consequence of a sclerotomy which was performed on the eye of a middle-aged woman for the relief of secondary glaucoma, following the incarceration of the iris after a cataract extraction. As in the former case, a cataract had been successfully removed from the fellow eye some years previously.

Dr. Posey said that explosive chorioidal hemorrhage is rare, Spaulding, in 1896, being able to collect but 100 cases from the entire literature up to that time. It was pointed out that while the hemorrhage may occur after vitreous prolapse or other mishap at the time of the operation, it is just as common apparently during and after operations which have been uncomplicated. The general condition of the patient, too, has seemed to exercise no determing factor in its production, for while it is true that many who lose their eyes through this complication are atheromatous, they are no more so than the large majority of patients who successfully undergo cataract operations, and many of those whose eyes are lost from chorioidal hemorrhage, have had a cataract removed from the fellow eye without complication either before or after that which was attended by the fatal hemorrhage. The exciting cause of the hemorrhage undoubtedly is the lessening in the intra-ocular tension attending the incision into the globe, whatever the predisposing cause may be.

Pathological evidence formerly seemed to indicate that the hemorrhage emanated from the arteries of the chorioid, as a consequence of sclerosis of their walls, which was part of a general vascular degeneration; but the microscopic study by Selina Bloom, in 1898, of four eyes which had been lost from chorioidal hemorrhage, showed that the arteries of the chorioid were healthy, but that the veins were diseased, being the seat of phlebitis and periphlebitis. The varicosities were limited to one eye, thus accounting for the usual occurrence of chorioidal hemorrhage in but one eye, and showing them to be of local origin and apparently independent of any general vascular degeneration.

Dr. Posey thought that the hemorrhage in the second case could be explained either by an outpouring of blood under the chorioid as soon as the increased tension in the glaucomatously inflamed eye was relieved by the escape of aqueous, or by the entrance of aqueous under the chorioid, with perhaps some transudation of serum into the subchorioidal space, through tears in the ciliary body which were made by the knife during the incision. He referred at some length to Fuchs' observations on this type of accident in his classic monograph upon detachment of the chorioid, both after the removal of cataract and iridectomy for glaucoma.

Dr. Zentmayer said that he had but a single experience with intraocular hemorrhage during cataract extraction, and that in the past week. He had had the senior interne at the Wills hospital operate upon the right eye of a man from whose left eye he had successfully removed a cataract thirteen months before. On account of the patient's behavior at that time he was etherized for the second operation. After the lens had been extracted, vitreous was found exuding from between the closed lids. This continued profuse, and without further examination the eye was bandaged. That evening the dressing was found saturated with blood and this continued for five days. The eye is sightless and there is a prolapse of vitreous and iris into the wound which is cicatrizing.

Dr. Risley said that he had been greatly interested in the case referred to in Dr. Posey's paper, where the hemorrhage seemed to have been due to ruptured varicose veins. In the case he had himself reported and to which Dr. Posey had referred, he did not think that this could have been true. In the first place the blood was bright red, and the hemorrhage so profuse that it ran down over the face and saturated the bedding. As in the case of Dr. Posey's patient, she refused to remain in the hospital, and went to her own home, where she died from an apoplexy within the first week after leaving the hospital. She had general arteriosclerosis, the radials being atheromatous.

Dr. Harlan said that several cases of extensive operative hemorrhage had occurred in his practice. In one, a simple iridectomy for secondary glaucoma, profuse bleeding occurred as soon as the incision was made and forced out the lens, iris, and vitreous. The ball was enucleated and was found to contain practically nothing but a blood clot. In another, an iridectomy preliminary to extraction, the vitreous was infiltrated with blood and the eye destroyed. In a third case he recalled, there was extensive hemorrhage in the vitreous after the cataract extraction, and the case was considered hopeless, but later the blood was absorbed and an excellent result was obtained.

Dr. de Schweinitz referred to the case which he had described before the Section of expulsive chorioidal hemorrhage after cataract extraction with loss of the eye, and to three other cases in which the termination was not so disastrous. The one, a dement, with chronic Bright's disease, had on the night following a simple extraction of cataract a hemorrhage sufficiently great to stain the bandages and spread apart the lips of the wound. The blood clot was removed and the wound closed with sutures. Gradually the eye cleared sufficiently to permit the patient to recognize hand movements. Whether further clearing would have taken place could not be stated, inasmuch as the patient died rather suddenly from uremic coma. Another case occurred in a very fat woman with advanced diabetes, the hemorrhage on this occasion being also great enough to stain the bandage and separate the wound. It slowly disappeared under treatment and the eye entirely recovered, although a thick capsule which was afterward submitted to De Wecker's operation vitiated for the time good vision. In a final case an hour after an ordinary combined extraction for cataract preceded by intense occipital headache and vomiting, there was a smart hemorrhage which separated the lips of the wound but then ceased, the blood clot from the anterior chamber gradually disappeared, and the eye entirely recovered, with excellent vision.

Dr. de Schweinitz assumed that in the three cases in which the result was comparatively favorable, the bleeding had come from vessels far forward. In other words, the hemorrhage was not an expulsive one, and therefore not to be classified with the first of his cases, which was in all particulars analogous to the one reported by Dr. Posey.

Dr. Posey said in closing that the cases showed the importance of examining the eye grounds carefully for vascular lesions, before the lens became so opaque that the examination was impossible.

Unilateral Exophthalmos, with Exhibition of the Patient.

Dr. G. E. de Schweinitz demonstrated a woman, aged sixty-three years, without any facts in her family or personal history of importance, who began to have right-sided exophthalmos shortly after a blow on the head, the exophthalmos having slowly developed. During this period, according to the account of her attending oculist, there were never any bruit, pulsation, or enlargement of the orbital veins, but the vision of the eye was gradually lost, owing to progressive atrophy of the optic nerve without preceding neuritis. She had had for a number of years attacks of so-called fainting spells, during which she remained unconscious for fifteen to twenty minutes, and in two of these spells, just prior to her examination by Dr. de Schweinitz, according to the hospital notes, there were severe convulsions, generalized on one occasion and confined to the right side on the other. There was no history of diplopia and not the slightest failure in rotation of the eyeball in any direction, which was proptosed straight forward. Neither were there any inflammatory signs in the orbit nor loss of sensation in the cornea. The eyeball could not, however, be reduced entirely by pressure, as the posterior portion of the orbit appeared to be resisting. The exophthalmos was not intermittent, and X-ray examination and examination of the sinuses failed to show the presence of any growth or exostoses or distention.

Dr. de Schweinitz discussed the various possibilities in the case, and excluded pulsating exophthalmos, accessory sinus disease or growth, and unilateral intermittent exophthalmos. He considered it doubtful that there was a growth in the orbit, as all examinations except the one referred to of inability entirely to reduce the exophthalmos by backward pressure, failed to show the growth, if it was present, or any inflammatory material or periosteal thickening. He thought it possible that the case might belong to those rare cases which had been reported, for example, by Uthoff and others, in which unilateral exophthalmos with optic nerve change had been caused by disease or tumor of the ventricles.

Dr. Weisenburg said that the case of Dr. de Schweinitz was first admitted in his service with a history of unconsciousness and Jacksonian convulsions, limited to the right side. The case was regarded as uremic, and in a number of days the mental and general symptoms cleared up and the present condition described by Dr. de Schweinitz was the only remaining one.

There is no indication of any intracranial lesion. No ocular palsies or anything which would lead to a diagnosis of a tumor either back of the eyeball or in any portion of the brain to account for the unilateral exophthalmos. In a recent paper of Dr. Rosenblatt (*Deut. Zeitschr. f. Nervenheilk.*, 1906) there were reported 19 cases of tumor of the brain with exophthalmos. In 6 the growth was limited to the frontal lobes. In a number to the third and lateral ventricles and other portions of the brain. Dr. Weisenburg recently has had 3 cases. In one there was marked bilateral exophthalmos and a most curious symptom in which the axis of the eyeballs was directed downward with paralysis of upward associated ocular movement. Necropsy demonstrated a tumor in the lateral ventricle. In the second case there was a tumor in the third ventricle causing pressure upon the optic chiasm, and in the third a tumor of the third ventricle alone. These cases are interesting because it is the belief of Uthoff that tumors of the ventricle often cause exophthalmos. The explanation, however, is not very clear. It is interesting, however, to consider that there was described many years ago a centre in the optic thalamus, irritation of which caused a protrusion of the eyeballs. Whether it is because of this that tumors of the ventricle cause exophthalmos it is difficult to conclude; but it is more difficult still to explain the cause of exophthalmos in tumors in the frontal lobe.

Dr. Harlan thought that as the proptosis was so absolutely resisting it seemed hardly possible that it could depend upon a vascular lesion. There must be something solid behind the ball.

Dr. Ziegler recalled a case that resembled this one which had followed on ethmoiditis with cellulitis, in which the dense deposit did not undergo resolution. He also thought an orbital hemorrhage with organization of the clot might have caused this condition. The nervous symptoms could be otherwise explained.

In closing the discussion, Dr. de Schweinitz said that the explanations of Drs. Ziegler and Harlan should receive full consideration, although it was difficult to understand how the earlier examinations of his patient could have escaped detecting sinus disease. Apparently, with the exception of the inability to reduce the exophthalmos by backward pressure. all examinations had failed to show growth, inflammatory deposit, or thickening, in the posterior portion of the orbit, but naturally they did not exclude entirely the presence of such conditions. The chief reason why he had suggested the exophthalmos as a possible sign of disease of the ventricle, tumor or otherwise, resided in the fact that the patient's clinical history gave evidence of intracranial disease, in the presence of attacks of unconsciousness, convulsions, as well as at one period in her life of headache and vertigo, although these last-named symptoms were not now present.

Hole at the Macula.

Dr. Zentmayer reported *Two Cases of Hole at the Macula.* They represent two types of cases: the first of traumatic origin; the second of vascular origin. The first case is on record as part of a previous discussion of this subject. The second case was seen at Wills Hospital, in a colored woman aged about thirty-five years. In the left eye the macular branch of the superior temporal artery was sclerosed, and just above the fovea it was entirely obscured by a glistening white, fluffy, round mass, probably connective tissue. Beyond this the vessel turned abruptly downward to the temporal side of the macula. The foveal region presented a perfectly round, sharply circumscribed, reddish-brown area, with a diameter about one-half that of the disk, with faintly pigmented edges and with four yellowish dots on its surface. The surrounding retina was hazy and showed numerous shifting reflexes. To the outer side of the fovea these were arranged in parallel lines, with a few scattered yellowish dots.

The probable explanation of these changes is that there has been an obstruction of the macular branch, with malnutrition and final atrophy of the retina, or there may have been an actual edema with rupture of the retina, although when the macular lesion is associated with vascular disease Dr. Zentmayer was inclined to believe with Kussel that "too much stress has been laid on the effect of edema and not enough upon vascular changes with resulting malnutrition and eventually atrophy.

Dr. de Schweinitz referred to several cases which he had already reported and to others which he had not yet recorded. He was particularly interested in those which on two occasions he had seen follow iritis, the macular lesion being ophthalmoscopically in all particulars exactly like that which is seen after trauma. He described another case which occurred in a woman who was the subject of arteriosclerosis and myocarditis, and to still another case, bilateral, in a young hard-working student with high error of refraction and with no history of trauma or disease. In two of his traumatic cases, in addition to the ordinary hole in the macula, there was rupture of the chorioid. In both of these cases the injury had been due to the blow of a ball upon the eye.

Chorioiditis from Antral Infection.

Dr. S. Lewis Ziegler exhibited a patient, aged thirty years, whose fundus showed a few isolated areas of chorioiditis, pigmented deposits, slight pallor of disk, and a web-like vitreous haze. Vision was reduced to 20/70, with marked contraction of fields and central scotomata. He had enormous puffing of the septum and turbinates, causing mouth breathing at night. There was a glairy mucopus escaping from the antrum, which contained pneumococci and staphylococci. When the nose was obstructed or bowels constipated the vision would suddenly drop, but quickly recovered. Has had headache for several years, and neuralgic attacks for two years. Had otic abscess two months ago.

His physician reported no improvement after five years of alterative treatment. The presence of mucopus, head pains and vacillating vision suggested possible intermittent nasal infection, dependent upon the degree of auto-intoxication and suboxidation present. Cauterization of the right turbinate and septal puff one month ago improved the breathing and antral drainage. Distant vision O. D. has recovered from 20/70 to 20/30, and the reading vision from J. 10 to J. 6, while the field has widened on the temporal side. The left nostril has not been treated and O. S. shows no sign of improvement. The lesion probably originated in minute foci of pneumococci infection arising in a semi-occluded antrum and accompanied by obstruction to free breathing.

EDWARD A. SHUMWAY, *Clerk.*

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Clinical meeting of December 14, 1908. Dr. T. A. Woodruff, President, in the chair.

A Case of Melanosarcoma.

Dr. William H. Wilder presented a patient, male, 57 years old, who has a growth on the right eye at the outer limbus. When first seen the growth measured about ten millimeters in diameter, was semiglobular in shape, with a papillary surface, somewhat pigmented, firm in consistency. The patient first noticed the growth last June and believes that it made its appearance suddenly. It has not increased very much in size since then. He came to the Infirmary three weeks ago and was placed under the care of Dr. Beard, who thinks that the growth has increased in size during these three weeks. Dr. Wilder excised about one-third of the mass under cocaine anesthesia. The growth was not very vascular, and was rather firm in consistency. It was rather fixed, and was encroaching slightly on the cornea. There is no indication of any on the interior of the eye, even after dilating the pupil *ad maximum.* Microscopic sections showed an unmistakable carcinomatous growth. At one point the basal membrane of the conjunctiva was broken through, the epithelial growth extending beneath it. The large epithelial cells which make up the growth are grouped together in characteristic carcinomatous patches, with alveoli surrounded by a distinct stroma. Many cells show pigmentation, particularly around the nuclei. It was impossible to determine at the time whether this pigment was melanin or the product of the healing process. It is probably the latter, the case evidently being one of melanotic carcinoma, which is extremely rare in this situation. The fundus is normal; refraction has not been measured carefully, but the man has good vision without any correction.

Dr. Dean asked Dr. Wilder how extensive an operation he would advise in his case.

Dr. Wilder stated that he believed that there was no involvement of the intraocular structure, and the question in his mind is whether he would be justified in excising the mass and carefully scraping the vitreous and then waiting for further developments, although sooner or later an enucleation of the eye would have to be done.

Dr. L. N. Grosvenor asked what the fundus findings were in the case, especially with reference to the ciliary body. LaGrane reported a case of carcinoma of the ciliary body with a large extrabulbar mass, an involvement of the ciliary body and the chorioid.

Dr. Wilder stated that after thorough dilatation of the pupil he was unable to find any fundus lesions as far forward as the vena vorticosae; nor was the vitreous clouded. Vision was 20/40; there was no detachment of the retina.

Dr. Henry Gradle asked whether it would not be feasible to excise deeply and close the wound by transplanting the conjunctiva and then use the X-ray for awhile, explaining to the patient that the slightest relapse would mean enucleation of the eye.

Dr. Frank Allport concurred in Dr. Gradle's suggestion, removing as much tissue as possible, even with transplanting the conjunctiva, and then the X-ray treatment. Of course, he said, the objection might be raised that the X-ray might injure the eye, but inasmuch as the eye is certain to be injured ultimately, nothing could be lost by such a procedure.

Dr. H. B. Young, some fifteen years ago had a similar case in which he excised the growth very thoroughly. It recurred, and he excised the mass a second time. It recurred again, and he suggested removal of the eyeball, and the patient then passed from under his observation.

Dr. O. Tydings, about six years ago, had a case similar to Dr. Wilder's, in which the cornea was involved. The patient gave a history of trauma fifty years before. An ulcer developed, but got well. Dr. Tydings advised an operation, but as he could not guarantee the integrity of the globe, the patient demurred and disappeared for six months. Then Dr. Tydings removed the growth in its entirety, and the only thing left was a black speck about the size of a pin-point, which is still present. Vision is perfect. The microscopic diagnosis of the tumor was melanosarcoma. Four months ago the patient was still well.

Dr. Frank Allport had a case twenty years ago which was diagnosed as sarcoma. He sent the man for consultation to a surgeon in another city, and when he returned the tumor had been removed. The mass was white in color; it did not recur up to ten or twelve years ago, the last time he saw the patient.

Dr. Wilder asked Dr. Tydings whether in his case an examination had been made for blastomyces.

Dr. Tydings said that the scrapings had been examined for tubercle bacilli, but not for blastomyces. No tubercle bacilli had been found.

Dr. Wilder said that cases that simulated lupus or epithelioma have proved to be cases of blastomycocis, and suggested that the tissues be examined for blastomyces.

Skin Graft for Pterygium.

Dr. Clark Hawley presented a boy, 11 years old, who had quite an extensive pterygium, the result of a firecracker burn. The growth extended nearly to the center of the cornea. The scar tissue was excised and a piece of skin taken from behind the ear of the patient's sister was transplanted into the eye with most excellent results, until about three weeks ago, when it was noticed that the skin which was involved in the symblepharon began to come forward close up to the cornea, necessitating a second operation. The fault lay in not putting something in front of the symblepharon over which it could not grow. At the second operation all of the cicatricial tissue was removed, leaving only the conjunctiva. With scissors the conjunctiva was undermined up to the central line of the eyeball, and then brought together with sutures, so that more than half of the cornea is covered with conjunctiva. A piece of skin was transplanted between the cornea and the remaining tissue, and the result was excellent, except at one little point where the tissue came up under the flap. The cornea now is absolutely clear, and the patient has perfect motion of the eyeball.

Progressive Primary Atrophy of Iris.

Dr. Alfred N. Murray reported this case for Dr. Wood. In March, 1904, the patient, male, about 42 years of age, first noticed a change in the iris of the right eye, the pupil seeming to be irregular in outline, just as though an iridectomy had been done. This change in the iris continued until now the iris has disappeared almost entirely. The tension of the eyeball is increased, but vision has not been interfered with to any very great extent. Nothing could be elicited in the patient's history to account for the condition. A search of the literature failed to reveal a similar case.

Probable Case of Lupus.

Dr. O. Tydings presented a woman, who, when she first came to him, on June 25, 1908, gave a history of an occlusion of the left nostril and a "pimple" on the right side of the lacrimal sac, which looked like a dacryocystitis, but he could not decide whether it was this or a case of perforating ethmoiditis. Apparently there was no connection between the pimple and the ethmoid sinus. The septum was perforated, probably the result of operative procedure, although previous operation was denied. She was placed on specific treatment for a time, and there seemed to be some improvement at first, but it did not continue. Below the lacrimal sac was a collection of pus, which he evacuated. By September the lesion had extended beyond the median line of the nose. The leucodescent light was used, thinking that the case might be one of tuberculosis, and tuberculin injections were begun. The first injection was given September 22nd, and every week since then one injection has been given. The patient has continued to improve under this treatment, and the lesion is healing rapidly. A distinct reaction followed the first injection, and a slight reaction followed the second. The ulceration resembled lupus, but several dermatologists who saw the patient thought that it might be a case of syphilis; others thought it was tuberculosis.

Retinitis Proliferans.

Dr. A. N. Murray presented a man, 37 years old, who three years ago had a sudden blurring of vision while pitching hay. He said that a sort of veil came over the right eye, and after a few months he was not able to distinguish features. About a year ago the same thing occurred in the left eye, and for the past few weeks he has been unable to distinguish anything. There has been no ocular pain, but for the last six months the patient has complained of temporal headaches. There is no evidence of inflammation, tension is normal, pupils react normally to light and accommodation, vision in both eyes is fingers at three feet. General health is good. Patient denies lues, but had gonorrhea twenty years ago. Urine, negative; Pirquet test, negative; physical examination, negative. About seven years ago he had suppuration of the glands of the neck, which lasted about a year. The diagnosis was made of retinitis proliferans.

The left fundus is invisible on account of the hazy vitreous. In the right eye, beginning at the disk, is a moderately large band of apparently white fibrous tissue, like a piece of twisted cotton, extending to the upper nasal quadrant. Fine tortuous vessels are seen all over it. There is another streak running down to the lower nasal quadrant. The vitreous is hazy.

Dr. Wilder referred to a case which he had exhibited before the Society last spring, which was a typical one of retinitis proliferans, where the strands of connective tissue were well-marked, more so than in Dr. Murray's case. The patient, a boy, twelve years old, had the trouble with his eyes come on spontaneously, without any history of injury. Vision was very much impaired. There was a very distinct response to the injection of tuberculin, so that the patient was put on tuberculin treatment, but there has been no change in his condition; if anything, the vascularity of the strands in the retina is less than it was, so that he probably will not furnish one of these interesting complications, such as intraocular hemorrhage, necessitating ligation of the common carotid artery, as was done in a case by Dr. Derby several years ago.

Dr. Tydings had a case a few years ago in a boy, 17 years old, with both eyes involved, one more than the other and far more extensively than in Dr. Murray's case. The bad eye cleared up somewhat later, but with the good eye he came to see fingers at a few inches only. The patient gave a history that the condition would clear up for a time, and then the hemorrhages recurred. His mother and a sister had died of tuberculosis; the father was alive and well. The boy presented no evidence of tuberculosis, nor did an examination of the lungs and sputum disclose anything.

There was one thing peculiar in this case, and that was a very chronic and obstinate constipation. The patient has been getting progressively worse.

Malignant Hemorrhagic Retinitis.

Dr. L. Wallace Dean reported the case of a young man 18 years old, who came to him about a year ago with both vitreous cavities almost filled with blood. The fundus was obscured by a dark red mass. Since then the fundus has been visible several times, and extending into the vitreous were blood vessels. The hemorrhages recurred. It was evidently a case of malignant hemorrhagic retinitis.

Traumatic Cataract.

Dr. W. E. Gamble reported the case of a woman, 34 years of age, on whom he operated recently for a cataract, probably traumatic. There was no nucleus in the cataract, simply the cortex. Within two weeks he saw a young man, 18 years old, who gave a history of traumatic cataract, the eye having been injured by a baseball seven years ago. The cataract was overripe in appearance. In the center of the lens there seemed to be an opaque spot, quite marked. He thought that there might be calcareous degeneration of the lens. On cutting through the capsule, a milky fluid flowed out, and on pressure he found a well-developed nucleus.

Trauma of the Eyebrow.

Dr. H. B. Young reported a case of trauma of the eyebrow by a piece of iron, but the man did not think that the eyeball had been injured. He had traumatic mydriasis, hemorrhages into the anterior chamber and vitreous. Vision remains poor, although the hemorrhages have been pretty well absorbed. The wound in the eyebrow is entirely closed. The man had nausea and headache at the time of the injury, and there was considerable chemosis thirty-six hours afterwards.

A New Advancement Operation.

Dr. George F. Suker described a new advancement operation consisting in the shortening of the muscle with one suture, preserving the original insertion of the tendon, closing the conjunctival wound, and bringing the muscle forward to the point of insertion. The operation leaves very little deformity.

Dr. Gradle has performed an operation similar in purpose, but not similar in execution. He split the tendon longitudinally and partly the belly of the muscle, putting in the suture as Dr. Suker does, but instead of going around the edge of the muscle, he went through it, drawing the ends of the suture together. He now uses not one suture, but two, tying them over aluminum plates. There is not so much tension, but the result is disappointing, because of the adhesions which are bound to form. The operation will do very well for minor corrections, he thought, but not for major ones.

Dr. Suker said that he had tried the method for four or five years and has found it serviceable even in very large degrees of convergence.

MORTIMER FRANK, *Secretary.*

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of November 21, 1908, in Denver. Dr. E. W. Stevens, presiding.

Recurring Corneal Bleb.

Dr. G. H. Strader, of Cheyenne, Wyoming, presented a man with a recurring translucent bleb of the lower and inner quadrant of the cornea. Chloride of zinc had splashed into both eyes. The right sclera sloughed, the cornea was lost, and the eye removed. The left cornea became opaque; but cleared except a nebulous opacity at the site of the recurring bleb. Applications of carbolic and nitric acid, respectively, had not checked the bleb-formation. Dionin and also yellow mercuric oxide ointment were being used.

Discussion—Dr. Jackson thought the recurring blebs were due to disturbance of the nutritional nerve supply, and that the condition would improve in time. He mentioned the case of a woman lately treated by him for recurring blebs in the central portion of each cornea. At times there was slight ulceration, which healed promptly under applications of nitric acid. In many attacks more than the epithelium was raised; and after subsidence, the lately bulging portion would not stain. The diameter of the bleb of the right cornea was 3 mm., that of the left was 5 mm. Quinin and arsenic had been given for malaria, and dionin used in the eyes; and more recently, atropin alternated with eserin instillations. Improvement had resulted. Hemorrhage from a uterine fibroid was being treated.

Dr. Walker had found a protective bandage, alternated with hot applications, valuable; but had seen no benefit from caustics. When the epithelieum once re-attached, he thought it likely to hold permanently.

Cocain Keratitis.

Dr. Edward Jackson, of Denver, showed a man with large crescentic ulcers near the upper corneal margins, extensive infiltration above lower margins, conjunctival hyperemia, photophobia and free lacrimation, but no anterior synechia. There was a marked and general dermatitis of the face. The history indicated that the corneal ulcers appeared last August. From September 5th until Dr. Jackson first saw him three days ago, 4% cocain solution had been instilled two or three times a day. After two applications of silver nitrate, and substitution of holocain for cocain, the ulcers had ceased to stain after three days, the lacrimation had lessened and the dermatitis had improved.

Discussion—Dr. Bane had seen keratitis follow the prolonged use of cocain after the removal of a foreign body from the cornea. Withdrawal of the cocain and use of a simple collyrium soon resulted in a cure.

Dr. Libby had observed entire denudation of the epithelium from continued use of cocain in a case of small corneal ulcer. Under the use of atropin, hot applications and a protective bandage the epithelium was quickly restored and the ulcer healed.

Dr. Strader mentioned the case of a young woman with infiltration of the cornea following the free use of 4% cocain solution. He replaced the cocain with a simple collyrium, used dionin, and curetted the anterior ethmoidal cells. The cornea cleared and vision rose to 20/40.

Dr. Patterson spoke of dermatitis exfoliatum as possibly caused by cocain, and resembling that caused by salicylic acid.

Dr. Sedwick recalled a case of cocain keratitis.

Dr. Jackson, in closing the discussion, thought there were probably originally ulcers at the upper borders of the corneas, due to poor nutrition and infection, that the skin affection was caused by the overflowing tears, and that the prognosis was favorable. He remembered a case in which two-thirds of the cornea was involved. Clearing occurred and vision became 20/50.

Albuminuric Neuro-retinitis. Blindness. Subjective Light Sensations.

Dr. D. A. Strickler, of Denver, presented a woman of 51 years who, two years before, had first noticed flashes of light, followed by dimness of vision, and pain in the eyes and temples. Bright's disease was diagnosed then. A year later the vision was 20/70 in each eye, with correction; each disk showed a swelling of four to five diopters; there were small hemorrhages about the disks and throughout the retina, but otherwise the vessels were not perceptibly altered. By June first of this year blindness was established in the right, and about August 1st in the left. Severe pains in eyes, temples and occiput continued, were throbbing in character, and a gushing sound accompanied each heart-beat. On lying down the appearance of a bright arc light prevented sleep. When presented before the Society this irritating symptom persisted, the disks were swollen and the retina showed minute hemorrhages and white spots of fatty degeneration. The blood pressure was 205 mm. by the Riva-Rocci instrument, with broad band. The urine continued to be loaded with albumin.

Discussion—Dr. Spencer related a case of vitreous hemorrhage associated with malaria, in a youth of nineteen.

Dr. Marbourg had seen relief from pain and unusually rapid absorption of hemorrhage from use of the high frequency current.

Dr. Jackson had observed Dr. Strickler's case, last January, when there were many small hemorrhages, 6 D. of disk-swelling, with little choking, and good condition of the macula and the periphery of the retina. There were marked general vascular changes, and a blood pressure of 185 mm. He had never before seen complete blindness from albuminuric neuro-retinitis.

Dr. Stevens thought the albuminuria was caused by high blood pressure and the pain by toxemia, in the case under discussion.

Palsies of Ocular Muscles.

Dr. A. C. H. Friedmann reported paralysis of the external rectus and paresis of the superior rectus of one eye, in a child of twelve years, with no history of previous illness. Strychnia and potassium iodid had given no relief.

Dr. Jackson mentioned two cases of recovery, under the iodides, of external rectus paralysis; one being a traumatic case in a child.

Dr. Strickler had noted paralysis of the external rectus disappear in a tabetic case.

Dr. Stevens mentioned the special exercises now being employed to train palsied muscles, even those of the eye, in tabes.

Dr. Patterson reported paralysis of the external rectus and paresis of other muscles in herpes facialis occurring in second-stage tuberculosis.

Low and High Ametropia—Squint.

Dr. W. C. Bane reported a man of 50 who had experienced relief for five years, of severe weekly occipital headache, vomiting and asthenia, by wearing —0.50 D. cyl. in one eye, —0.12 D. cyl. in the other. Recent return of these distressing symptoms seemed to be due to a change of axis, not of amount, of the astigmatism.

Dr. G. F. Libby reported myopic astigmatism of 8.5 D. in one eye, 12 D. in the other. Also that in a case of convergent squint in a child of eleven months, fitted with 2. D. spherical lenses in December, 1906; only slight improvement in the squint had occurred. The eye that usually deviated, fixed oftener than formerly; but still much less often than its fellow. Recent tenotomy (Critchett's) of the internal rectus of the squinting eye overcame most of the esotropia of 30 to 35 degrees. On re-measuring the refraction, the hyperopia was found to be reduced to 1.50 diopters. This correction was ordered; and ½ per cent atropin once daily in each eye, for one to three months.

Gunshot Wounds in Temple.

Dr. Jackson reported good vision and ocular movements of the right eye following the passage of a bullet through the right temple. The left eye protruded, with swelling of the upper lid and ptosis, which probably concealed diplopia. When, after a few days, the exophthalmos subsided, the sight of this eye was found to be undisturbed.

Dr. Friedmann reported the entrance of a bullet through the left temple and its exit at the external angle of the right eye. The only injury to the left eye was the production of internal strabismus. The right eye became blind from optic atrophy.

Meeting of December 19, 1908, in Denver. Dr. D. H. Coover, presiding.

Traumatic Cataract.

Dr. C. A. Ringle, of Greeley, showed a man of twenty-eight, who had first presented himself on November 20, 1908, on account of an injury to the left eye, received 48 hours before while handling barbed wire. A barb had penetrated the upper lid, cornea and lens-capsule, avoiding the iris. There was beginning opacity of the lens, with conjunctival and pericorneal injection. Two days later the lens was considerably swollen, and at the end of a week it was pushing the iris forward. Later the lens protruded through the pupil, obliterating the anterior chamber, and showing signs of disintegration. The treatment had consisted of atropin, dionin, heat, bandage, potassium iodid, calomel and salines. The congestion had subsided, the normal depth of the anterior chamber was restored except for a slight bulging of the iris in front of the greatest swelling of the lens, particles of softened lens matter could be seen in the aqueous, vision was light perception only. At no time had the tension been elevated or complaint of pain been made.

Discussion—Dr. Jackson noted lens matter in the lower angle of the anterior chamber, that the eye was in good condition, that the lens was disintegrated and likely to be entirely absorbed.

Dr. Strickler had observed complete absorption at 35 years.

Dr. Black recalled a boy of eight in whom a staple of barbed wire fence that he was pulling on, penetrated the corneal limbus. The opaque lens was absorbing, when bullous keratitis, opaque cornea and softening of the eye occurred.

Dr. Libby believed that later on a broad discission of the lens-capsule would be safe, and would materially hasten absorption of the cortex.

Coloboma of Iris Involving Chiefly the Pigment Layer.

Dr. Edward Jackson, of Denver, presented a man, aged 28, in whose left iris a narrow slit extended downwards from the pupil. The slit was less than one-half millimeter wide, and looked rather like a streak of pigment or a large iris cleft. The ophthalmoscope showed it to be a true coloboma. It was separated from the normal pupil by a bridge of tissue ½ mm. wide. The movements of the iris and form of pupil were normal, the two pupils being equal. By transillumination, however, a coloboma was demonstrated, 3 mm. wide, and extending from the pupil to the ciliary region. The lens and chorioid were normal; there was no congenital defect outside of the eye. The ophthalmometer, however, showed 7 D. of corneal astigmia; and with — 1.50 ⁀ + 7. cy. ax. 78° the eye had 4/15 vision. Dr. Jackson had frequently encountered extensive defects of the uveal layer of the iris, as shown by transillumination, after traumatism.

Rupture of the Sclera.

Dr. W. M. Carling, of Denver, showed a woman of twenty-four who had first come for examination, November 20, 1908, giving a history of inflammation of the right eye and neuralgic pain for four weeks previous; with rheumatism prior to any ocular disturbance. There were found a contracted pupil, complete posterior synechia, anterior chamber half filled with blood, ciliary tenderness, bulging of the sclera on the temporal side, and light perception only. The eye was intensely inflamed. Three days later rupture of the sclera, with escape of vitreous, had occurred. Dr. Melville Black now took charge of this case, in Dr. Carling's absence from the city. The rupture soon closed, the inflammation subsided under use of atropin and dionin, but the eye softened and vision was not regained except ability to count fingers.

Discussion—Dr. Black thought the rapid healing and cicatrization militated against malignancy, but hesitated between scleritis and iritis as to causation.

Dr. Stevens considered that the rupture was explained better by scleritis than iritis; for although iritis, with complete synechia, had occurred, the adhesions had torn off sufficiently to prevent glaucoma and bursting of the globe.

Dr. Jackson supposed local imflammation and softening, possibly from abscess or ulcer, with rupture at this point from thinning; and spoke of staphyloma of the sclera from gumma or tubercular growth. He thought that bleeding into the anterior chamber suggested malignant growth.

Dr. Neeper would suspect tuberculosis from the patient's general appearance.

Pulsating Exophthalmos.

Drs. D. H. Coover and E. W. Stevens presented a case in which pulsating exophthalmos had been relieved by tying the common carotid. (This case will be fully described later by the ophthalmologists in charge.)

Pearl Cyst of Iris.

Dr. Coover reported a pearly white tumor starting from the superonasal corneal limbus, with its apex free in the anterior chamber. A nail had penetrated the eye at the sclero-corneal border, and traumatic cataract resulted. There was slight ciliary tenderness, but no pain. He had observed the tumor for two years.

Discussion—Dr. Jackson said that it was a traumatic pearl cyst of the iris, seemingly.

Dr. Black recalled a case of penetrating wound of the sclera, near the corneal limbus, seen about 15 years ago. A scleral ectasia formed at the point of penetration, and a pearly cyst developed in the anterior chamber, after about two years. The ectasia had been overcome by the removal of an elliptical piece of sclera, with stitching. At the same time the cyst emptied itself, and its sac became obliterated, presumably by being caught in the scleral cicatrix.

The So-Called Circumlental Space in Glaucoma.

Dr. Jackson pointed out that the arc of illumination in the sclera between the corneal margin and the ciliary region, which has been spoken of as the "circumlental space," was in no way dependent upon the space between the margin of the lens and the ciliary processes. That under the conditions of transillumination or diaphanoscopy it was quite impossible that the circumlental space should cause any such ring of illumination. The appearance was not essentially altered by the absence of the lens, its dislocation, or congenital smallness of the lens. He then demonstrated how with the pupil strongly illuminated with the diaphanoscope placed well back on the sclera, no such "circumlental" arc appeared. But as the tip of the instrument was brought forward, so that it lighted the sclera at the edge of the anterior chamber, the arc was seen, and was best developed when the illumination of the fundus had faded so that no glare was seen in the pupil. The *circumcorneal illumination* is due to light transmitted across the anterior chamber, and concentrated by reflection from the posterior surface of the cornea upon the region of Fontana's space. The "circumcorneal arc" he found narrowed in at least some cases of glaucoma. But this was perfectly explained by the diminished angle of the anterior chamber through forward displacement of the iris.

George F. Libby, *Secretary.*

PROCEEDINGS OF THE OPHTHALMIC SECTION. ST. LOUIS MEDICAL SOCIETY.

Meeting of October 14, 1908. Dr. A. E. Ewing, presiding.

Papilloma of the Caruncle.

(Dr. Ernst Saxl.)

This patient, a boy, came to Dr. Saxl's office about September, 1905. He then removed a tumor about the size of a small pea from the caruncle of the eye. It did not show any recurrence until October, 1908, three years afterwards. During that time nothing had been done. From the same place, a tumor about the size of a small pea was removed. Since then there has been another slight recurrence. It is a cauliflower growth and the bleeding was very slight.

Spontaneous Rupture of the Lens Capsule in a Cataractous Eye.

(Dr. A. E. Ewing.)

The eye that is here presented was first seen by Dr. Green, Sr., and myself in 1894, because of having become blind during the preceding four months. The cause of the blindness was a fully ripe cataract which it was considered best not to interfere with as the other eye was only slightly involved. Five years later the patient returned with also a fully developed cataract in the then better eye. There being some question as to the healthfulness of the first eye affected, the latter was chosen for operation, and an extraction performed which has remained successful.

Two years later, the first eye passed through a mild glaucomatous attack which was controlled by eserine and pilocarpine. Now, after seven years, he again returns with absorption of the cortex and an apparent rupture of the lens capsule, within which, attached to the capsule, are several calcareous-like particles, and also a luxation of the capsule containing the nucleus partially through the pupil, more than one-half of the nucleus being in the anterior chamber. The globe is entirely quiet, vision is 1/192 and there seems to be no good reason for operative interference.

Conjunctival Cysts and Papillomata.

(Dr. Adolph Alt.)

It is the custom of writers on conjunctival cysts, to divide them into lymphatic cysts, glandular cysts, and cysts by inclusion. To these are added cysts caused by entozoa, rare in this country.

Lagrange states that conjunctival cysts are frequent. Yet, Dr. Alt's experience has been to the contrary, as he has only seen four cases in thirty years of practice. Among conjunctival cysts so far observed, lymphatic and glandular ones seem to have been more frequent. The lymphatic cysts usually lie on the nasal side of the bulbar conjunctiva between the caruncle and the cornea or in the fornix, and seem to take their origin from pre-existing lymphatic vessels. In lymphangiectasiae, the walls between the enlarged lymph-vessels break down and form one large cavity, and thus a lymphatic cyst results. These cysts are mostly round or ovoid, of small size and contain a clear uncolored fluid.

The interior of such cysts is usually covered with an endothelial coat of flat cells, usually forming only one or two layers.

Cabanne draws attention to the fact that in the contents of lymphatic cysts, a considerable number of leukocytes and lymphocytes are found. Glandular cysts are found most frequently in the upper and lower fornix, and rarely in the bulbar conjunctiva, and are usually larger than the lymphatic cysts.

It is the general opinion that these cysts take their origin from Krause's or Henle's glands, and are probably due to inflammatory affections, perhaps to traumatism. In other cases they are thought to take their origin from abnormal glands in the conjunctiva. The characteristics of their epithelium are that there are several layers of cells, usually more cylindrical near the base, more flattened toward the interior.

The rarest conjunctival cysts are inclusion cysts, which are always due to an injury or an operation, and show the same changes which are found wherever live epithelial cells have become enclosed in other tissue.

Dr. Alt reports four cases.

Case 1. Young lady. Under the upper lid a tumor 11 mm. long, wider on both ends than in the center, movable with the conjunctiva. This was a glandular cyst.

Case 2. Man, who had one year previous received a superficial injury by powder. Small vesicle formed in conjunctiva between caruncle and cornea, size of pea, movable; contents transparent, colorless. Sections of anterior wall of cyst show it to be lined with one layer of flat endothelial cells.

Case 3. Woman. Small colorless cyst in lower inner quadrant, movable. Section shows one layer of endothelial cells and some leukocytes and lymphocytes in coagulated contents.

Papilloma of the conjunctiva, like that of other parts of the body, consists of connective tissue papillae containing blood-vessels and covered with proliferating epithelium. These tumors presenting the well-known cauliflower-like arrangement, are not very frequent in the conjunctiva. They seem to have a predilection for the nasal side, especially the plica semilunaris and the caruncle. They are prone to recurrence and may assume the character of a true epithelioma and grow into the depth.

Dr. Alt showed specimens presenting the well-known arrangement of connective tissue, blood-vessels, and epithelium which had been removed with no relapse.

A Case Presenting Repeated Burns of the Conjunctiva, Self Inflicted.

(Dr. L. F. Henderson.)

On July 13th, 1908, Sister A. was referred to me on account of what seemed to be a mild form of catarrhal conjunctivitis.

Two days later, the left eye showed several small, irregular-shaped, white burns on the conjunctiva of the lower lid. One of the spots extended over the lid margin to the skin. After four or five days' treatment, the spots faded out and restoration to the normal seemed imminent. The right eye, in the meantime, had recovered from the conjunctivitis.

On July 20th, the patient came again with several large, white patches on the right lower lid.

The bulbar conjunctiva was injected and the lids were swollen. The patches presented an appearance which could only have been produced by some caustic. The largest burn was on the lower lid near the inner canthus.

I had Dr. Houwink, Dr. Hughes and Dr. Semple see her and we all agreed that the lesion was a self-inflicted burn. I saw her every other day and the last attack gradually subsided as the previous one had. It was nearly well when one day she appeared with the right eye freshly injured and more seriously than ever before. This time the white patch extended from the middle of the lid to the caruncle and up on the ball to the cornea, involving the whole lower nasal quadrant. The burns before had never involved the ocular conjunctiva and were not deep enough to leave any dangerous scarring of the mucous membrane, but this time I saw there would necessarily be considerable symblepharon and I realized that she might destroy her eye, if not thwarted in her purpose.

On August 24th, Dr. Luedde took smears from the necrotic area. His report is as follows:

"The smear taken from the necrotic area of the lower lid of Sister A's right eye, August 24th, shows broken down tissue with a few fibrinous shreds. No histological detail or bacteria demonstrable."

He agreed with me that the lesion was a burn. When I informed the Mother Superior of the nature of the trouble, I was given the history of a previous injury as follows: Over two years ago, the patient claimed to have cut her left wrist in lowering a window-sash, when the glass broke. The original cut was a small matter, but instead of healing, the wound gradually extended up the left arm. From this wound the surgeons were constantly removing pieces of broken glass. The wound would seem to close up and would mysteriously reopen.

This process was kept up for nearly two years, by which time there was a long, granulating sore extending from the wrist to above the elbow. When dressing it one day, the surgeon found a hairpin lying in the bottom of the wound above the elbow. After this episode, the dressings were made of such a nature as to prevent any interference on the part of the patient. Recovery thereafter being normal.

I arranged with Mother Superior to have the patient isolated and kept under strict surveillance. When accused of tampering with her eyes, she flatly and sullenly denied it. However, since her isolation, the recovery has been rapid and consistent and no relapses have occurred. There is now a cicatrizing scar which will in time cause adhesion of the lower lid to the ball as far as the cornea.

These cases are attributed to insanity, hysteria and malingering. The term hysteria is being used too loosely in medicine. I believe this patient insane.

Discussion—Dr. Meyer Wiener had had a patient, a young girl, about a year ago with acute conjunctivitis. The usual remedies were used and the patient got well within a few days. Later this condition developed in the other eye. After treatment the inflammation subsided, but a few days later reappeared in the first eye. In treating the eye, he found in the canthus something resembling a bit of coal, and knowing something of the nervous temperament of this patient, he consulted her practitioner and found that she had formerly had a skin trouble, which was probably due to the use of carbolic acid. It developed that she had also been treated by an ear specialist for an ear trouble, probably self-inflicted.

Dr. Llewellyn Williamson reported a case of a girl, 14 years old, who last year had been brought to him claiming to have been struck in the eye with a hatpin, while at school, and that, as a result, she could not see.

Examination showed no signs of injury but a considerable hypermetropic astigmatism which was corrected. A few months ago, the patient again presented herself, complaining that the eye was watering and burning. Examination showed a distinct zone of erythema, involving the upper and lower lids, and about one-half inch of the surrounding skin.

The margins of this zone were clear-cut and well defined, and terminated abruptly in a white line just below the margins of the lids. No edema or brawniness of the skin, no signs of any inflammation beyond the erythema. A perfectly bland ointment was prescribed, and that night Dr. Williamson was astonished to receive a telephone message that the ointment, when applied, caused intense pain and burning and made the tears pour out like rain.

Several attempts at treatment with various medicaments produced similar results, and finally the patient was sent to a dermatologist, who expressed the belief that the condition was self-inflicted. All efforts of the dermatologist to relieve the condition failed, and the patient was then referred to a rhinologist for examination of her sinuses.

Nothing definite resulted from this examination and she was referred to a neurologist, who thought the condition one of atrophic disturbance of the nerve supply of the orbicularis.

A general practitioner considered her condition due to anemia. Finally, by way of experiment, a collodion dressing was applied covering the entire area of the erythema, and in two days, when the dressing was removed, the erythema was found to have disappeared. A day later, the patient returned with the eye in the same condition as before.

Convinced now that the condition was self-inflicted, the mother was sent for, and both child and mother closely questioned. Both denied the possibility of self-injury. Further questioning developed the fact that the child disliked her teacher, and when she went to school her eyes immediately became red, tears flowed, and she could not study. Whenever an occlusive dressing was kept on the eye, there was no erythema. When the dressing was removed, the erythema returned.

This condition continued until the close of the school year, when the child immediately recovered.

It might be said, in passing, that the mother attributes this cure to the influence of prayer.

Meeting November 11, 1908. Dr. E. W. Ewing, presiding.

Hysterical Amblyopia.

(Dr. F. P. Parker and Dr. Wm. L. Nelson.)

Mrs. E. K., age 76, nativity, Ireland, applied for treatment in the eye clinic of Washington University Hospital, August 12, 1908. She stated that she was not able to see at all, and was led to the clinic by her daughter-in-law. The following story was elicited:

Patient was third child in a family of nine, four living. One sister died of cancer. Father lived to be 78 years. Mother 71. Family otherwise long-lived and healthy. She was the mother of six children, one living. Two died of tuberculosis, one, she says, of spinal fever, attributed by her to a fall.

Patient has usually enjoyed good health. About two years ago there occurred a period of about one week, during which she could not hear. She states that she could see people when in their presence and knew they were talking, but she could not hear them.

One day while she was at her sister's house she was told by her sister that the reason she could not hear was that she remained alone so much, and did not see or hear people until she had become unable to hear what they said. She agreed that this was true. There were several people present, and shortly after this conversation she could hear perfectly well. Her hearing has remained good since.

About four months ago she had an attack of gastritis, which lasted three or four days.. About three months ago she noticed that her vision was not as good as formerly. At that time, and for some time previously, she had worn a pair of glasses, which one of her friends had told her, if she continued to wear, would injure her sight.

Her daughter-in-law states she has been a steady drinker, sometimes greatly to excess. On June 15th, 1908, while in apparently splendid health, suddenly she experienced a flash or, as she described it, a yellow streak passed before both eyes, and she became perfectly blind. She maintains, however, that she was able to conceal her condition from her family until five days later, when she fell and broke her arm.

External ocular examination reveals nothing abnormal. Pupils react to light and accommodation, also consensually. Muscular movements normal. Fundus normal; refraction plus three. Patient claims to have no sight, but follows movements readily. Also will walk to a designated chair across the room and sit down. Will not count fingers correctly; miscalls objects held in front of her; unable to fix attention sufficiently to take field of vision.

The case being evidently one of hysteria, she was referred to Dr. Wm. L. Nelson for neurological examination.

Neurological Findings.

Prompt reaction of pupils to light and accommodation. Pupils equal and of normal size. Marked anesthesia of left cornea and decided diminution of corneal reflex on right side. There was no nystagmus or eye muscle defect. Pharynx anesthetic, more marked on left side. Innervation of facial muscles equal. The tear reflex, demonstrated by Spiller of Philadelphia, is present. This consists of a copious flow of tears upon stimulation of the nasal muous membrane. In organic disease, involving the ophthalmic division of the trigeminus, we woulid expect to find this absent.

There is analgesia involving the left side of the face, left shoulder, and whole left upper extremity. There is also a band of anesthesia encircling the left leg, extending from the ankle to just above the knee.

There is hyperesthesia of both mammary and inframammary regions. The joint, muscle and stereognostic perception are fairly normal. There are no muscle contractures or paralyses. The knee jerks are slightly exaggerated. Achilles jerks are normal. There is no ankle clonus and the plantar reflex is normal.

Her touch sense is good. Temperature sense not tested on the first examination. While the patient maintained her inability to see, I noticed that during the examination she was able to move around the room between tables and chairs without inconvenience. She recognized me after seeing me the first time, and from her actions I was satisfied she could see some.

On August 26th, four days after my first examination, she was able to count fingers, but there was pronounced monocular polyopia. She said she was satisfied she could see better than on her first visit.

On August 29th, she was able to tell the color of an individual's hair, and could see objects better than on her previous visits. On September 2nd, her vision had improved until she could see objects about 15 degrees from the central line of vision.

I did not see her again until October 12, when Dr. Parker and I saw her together. She said that her vision was about the same as it was when I last saw her, but assured me she would be able to see very well if she just had her glasses. She had been crying, and she said that fact caused her eyes to be a little dim.

On examination, the left cornea was still anesthetic, the right slightly so. The analgesia affecting the left side of the face and left upper extremity had disappeared. On the right postero-lateral part of the chest was an area of analgesia, extending from the lower angle of the scapula downward about four inches, and from the spinal column around to the right mid-axillary line.

There was thermo-anesthesia on both lower extremities extending up to the hips. The right visual field had increased to about 25 or 30 degrees from the central line of vision on the temporal side. The left field apparently had not increased any. The only treatment this patient received was psychical. There was distinct improvement as long as she was under observation. It is quite probable that had she continued under treatment there would have been still greater improvement, for it was very noticeable how susceptible she was to suggestive influence.

Some Ophthalmic Cases with Specimens.

(Dr. James Moores Ball.)

I. Hydrophthalmos, Trauma, Dislocation of the Eyeball.

In 1900, a girl, aged four years, was brought to my clinic, showing hydrophthalmos of both eyes. The history obtained at the time was as follows:

At birth her eyes seemed to be normal. Two or three days later, she developed a purulent conjunctivitis. She was treated by a member of this Section. Her eyes gradually enlarged and vision was lost except for light perception in the left eye. Five years later, namely July 29th, 1905, this child was again brought to me. On the afternoon of this day, while playing alone, she stooped and struck her right eye on a projecting knob of a chair. The mother states that immediately after the accident the eye did not present any unusual appearance. One hour after, however, the eyeball was dislocated, as is shown in the accompanying photograph. Immediately after the injury, she had pain in this eye, which continued for one hour. The mother says, "until after the eye had gradually worked out." I saw her at five o'clock, four and one-half hours after the injury. After having this photograph made by electric light, the child was chloroformed; the eyelids were separated with retractors and the eyeball was gently replaced. A silk suture was passed through the outer third of both lids and a compress bandage was applied. On August 10th, the stitch was removed. During this period considerable fluid ran from the eye. One year later my records show that only a small sunken stump remained to mark the site of what had been a hydrophthalmic globe.

Early in September of the present year this patient was again brought to me. Her age is now thirteen years. Of late she had severe pain in the left eye. On September 12th, I enucleated the globe which I now pass for your inspection. It measures 45 mm. in the antero-posterior diameter, and 30 mm. transversely. The diameter at the base of the cornea is 28 mm. Although I have not had time to make a prolonged search in the literature, this eye is the largest one of the kind I have found recorded.

The influence which the presence of the eyeball has upon the growth of the orbit is shown in this patient, the right orbit being smaller than the left one.

II. Flat Sarcoma of the Chorioid.

In regard to the second case, I regret that my notes have been mislaid. A few weeks ago, D. M., male, aged fourteen years, was brought to me. The present trouble began about four months ago. Vision of the right eye has been lost for several weeks. Examination showed an ordinary picture of absolute glaucoma. Tension was plus 2. Owing to opacities in the lens, the ophthalmoscope could not be used with satisfaction. Diagnosis: Secondary glaucoma. Enucleation was advised and was made on October 13, 1908. After hardening, the eye was bisected. The specimen shows a flat, whitish, jelly-like, elastic mass situated between the retina and the sclera. The retina is detached from the optic nerve to the ora serrata. Microscopic examination by Dr. C. A. Vosburg shows a small round-cell sarcoma.

The interesting feature of this case is the shape of the new growth. According to Parsons, flat, diffuse or infiltrating sarcoma of the uveal tract is extremely rare. In 1904 he was able to collect only 31 cases from the literature. The term "ring-sarcoma" has been applied by Ewetsky to those sarcomas of the chorioid which involve also the ciliary body and iris.

Discussion—Dr. J. Ellis Jennings said that he remembered seeing the first case presented by Dr. Ball, and he was certainly struck with the enormous size of the eye. The question of etiology might receive some little discussion as to whether this enormous enlargement was congenital, or whether it was acquired after ophthalmia neonatorum. There must have been some congenital cause to account for this tremendous expansion of the eyeball in both eyes.

There were countless cases of ophthalmia neonatorum with ulceration and perforation, but he had never seen anything to compare with this case.

Dr. Julius Gross said that at the Missouri School for the

Blind there was a boy who had double hydrophthalmos. He believed that Dr. Charles had also seen this patient. The boy had a brother who had been at the school prior to the time that he was there, and this brother also had the same condition. The sight was perhaps not as bad as one would have expected from the appearance of the eye. Concave glasses improved the vision considerably. He was at the school several years, and the size of the globe did not increase materially. In this case there must have been an hereditary factor, from the fact that the boy had a brother with the same trouble.

Dr. Alt said that these cases of so-called hydrophthalmos had all to come to enucleation. He remembered a child brought to him with a double hydrophthalmos, which evidently was what is now looked upon as a congenital glaucoma. There was a deep anterior chamber and a very large pupil. This child had some vision. After treating with eserine, iridectomy was proposed, and after operation was done on one eye there was decided improvement in the vision. Later operation was performed on the other eye.

Following that operation there was decided improvement. What the future history of the case was, he did not know. It was evidently a congenital affection, but there was no staphyloma. He believed that it was a congenital glaucoma which had stretched the whole eyeball.

Dr. John Green, Jr., asked whether Dr. Ball had experienced any particular difficulty in enucleating this enormous eyeball.

Dr. Wm. H. Luedde asked what was the thickness of this flat sarcoma.

Dr. Ball, in conclusion, in reply to Dr. Luedde's question as to the thickness of the sarcoma, said that it varied from 2 to 5 mm. in thickness.

In regard to Dr. Green's inquiry, he said he had some difficulty in delivering the globe, but did not find it necessary to split the canthus, succeeding in delivering the eyeball unruptured through the natural opening. In regard to the case of hydrophthalmos, the injury to the right eye produced a rupture of the sclera, and that accounted for the disappearance of the large eye after it had been replaced in the orbit.

Transplantation of Corneal Tissue. (Keratoplasty.)

(Dr. Ernst Saxl.)

Having seen the only successful case on record (Zirm's), Dr. Saxl made the following report and reviewal of the literature:

The operation of *Keratoplasty* dates from 1824, when Reisinger suggested it, and made a few experiments on rabbits. Von Dieffenbach and others took up the suggestion with enthusiasm, the original operation being modified in various ways, and different instruments devised to facilitate it. The difficulties to be overcome were first clearly formulated by Marcus, viz., (1) perfect correspondence in size and form of the graft and the opening; (2) rapid transference of the graft; (3) ready fixation of the graft; (4) prevention of the inner parts of the eye from being pushed forward through the opening.

All the early attempts were without success, and the operation was gradually lost sight of, until it was brought to light again in 1872, by Power, and 1877, by von Hippel. Their cases, however, were failures, and it was reserved for Sellerbeck, 1878, to get the first successful result. His success, however, was only temporary, for though the patient, on the fourteenth day, could read medium sized writing, his vision failed by the twenty-first day, and five months later the graft was more opaque than the untouched areas. So once more the operation, as a means for the recovery of vision, disappeared, and was only employed in order to reduce ectatic corneal cicatrices and to produce firmer scars after corneal affections.

In view of so many failures, the success attained by Zirm in a case which he records, deserves widespread recognition. He is able to report a continuance of such transparency as was present at first, eight months after the performance of the operation. The essential facts of the case are these:

A. G., a workman, 45 years of age, received a quantity of unslacked lime in each eye on the morning of August 10, 1904, and presented himself at the hospital on the same day. There was then a considerable quantity of lime still lying in the conjunctival sacs, and the membrane lining both upper lids was swollen and reddened. The cornea of each eye was of a gray-white color, and almost opaque, hardly permitting the pupil to be made out at all. The patient left the hospital on November 17th, following, with both cornea like ground glass, the irides just barely visible; able to count fingers at one meter with the left eye and at half a meter with the right. He was readmitted on November 22, 1905, showing then a very small degree of symblepharon, not sufficient to interfere with ordinary movements, with both cornea entirely opaque except for the extreme periphery above at the limbus. Vision was reduced to knowledge of hand movements, but on both sides light perception and projection were prompt. Zirm determined to transplant cornea to replace the scar tissue, but he had to wait until December, 1905, for suitable material, which offered itself under the following circumstances: K. B., a boy of 11, injured his right eye in July, 1905, by a fragment of iron which flew from a piece which he was striking. On admission, he was found to have a small scar at the top of the cornea with an anterior synechia, and a pear-shaped pupil, behind which lay a grayish-white opaque layer. He was able to count fingers at 2½ meters. Under chloroform, two attempts were made to extract, with the magnet, the foreign body which certainly was present. At the first attempt the iris bulged forward, but after an iridectomy, performed to permit the escape of the foreign particle, it could not be induced to present, either with the large or the hand magnet; then, after a copious loss of fluid vitreous, the globe collapsed, and on December 7, 1905, the eye was excised. It was immediately immersed in warm normal saline solution. At the same time, A. G. was put thoroughly under chloroform and transplantation to his right cornea carried out. The first step was the formation of a conjunctival bridge below, then by means of von Hippel's trephine, a disk was removed from the peripheral portion of the cornea of the enucleated eye. Then with the same trephine, a disc, of course of exactly the same size, was removed from the leucomatous cornea, the transparent disc placed in the gap, and the bridge of conjunctiva drawn across it and stitched. This operation was not a success.

At the same time another disc was removed from the cornea of the enucleated eye, this time from the center of it, immediately wrapped in gauze squeezed out of warm salt solution, and kept moist and warm in a stream of aqueous vapor. With the greatest of care and not a little difficulty, a disc was then removed from the patient's left cornea and the corresponding piece of clear cornea inserted in its place, care being taken to touch it with no instrument from the beginning of the operation to the end. The new patch on the cornea fitted perfectly, both as to size and thickness, and in order to retain it satisfactorily in place, Zirm inserted two stitches in the conjunctiva, making a St. Andrew's cross of thread over the center of the flap.

A week later the graft in each eye was clear, and with the left eye he could count fingers. In a few days the graft in the right eye began to give trouble, and had to be removed, but the left eye did better, and on January 12, he could count fingers with it at 3½ meters quite readily. On February 23, on focal illumination, a very faint haze could be seen, but part of the pupil margin was actually visible. On March 11, the patient went home, the clear graft looking black against the gray, cloudy, opaque cornea. On June 25, this was still true; the cornea itself was opaque, whitish and intersected superficially, with branching vessels. The graft, however, had none of these, and at its margin was very sharply differentiated from the cornea by a tendonous looking ring. Just there the tissue was so perfectly clear that details of the iris could be made out quite well. Within that ring one or two very fine lines of opacity could with difficulty be made out; except for them, the graft was quite transparent. None of the vessels mentioned above as being visible in the cornea penetrated the graft. The eye could even be examined with the ophthalmoscope and the disk carefully inspected. Vision was 5/50, and with a convex lens 3/20 and J. 13. The patient was able to get out by himself quite well, and even to perform such work as feeding and attending to cattle.

Zirm thus summaries the essential points:

1. The exclusive employment for the graft of human cornea, if possible youthful cornea, whose nutritive condition is favorable.

2. The exclusive employment of von Hippel's trephine, and instillation of eserine if the anterior chamber is present.

3. Deep anesthesia, strict asepis, and the avoidance of antiseptics.

4. The protection of the graft until it can be placed in position, between two pieces of gauze moistened with sterile physiological salt solution and kept warm in steam.

5. The holding of the graft in its place by two threads drawn through the conjunctiva and forming a cross in front of it.

6. Selection of cases.

The operation may be used also to take the place of an iridectomy or an iridomoty in cases of central cicatrices following corneal ulcers. If necessary, the graft can be cut and placed a little eccentrically.

Zirm has in this case achieved a real triumph, which ought to be generally acknowledged, and which should encourage others to repeat the attempt in similar cases or circumstances.

LLEWELLYN WILLIAMSON,
Section Editor.

NEWS AND NOTES.

Douglas Argyll Robertson.

Douglas Argyll Robertson died at Gondal, India, January 3rd, 1909, in his seventy-second year. Although known throughout the medical world as Argyll Robertson, his full name as it appears in the Register of the Royal College of Surgeons of Edinburgh, was Douglas Moray Cooper Lamb Argyll Robertson.

Graduated in medicine in 1857, he at once interested himself in ophthalmology. From 1867 to 1870 he was assistant ophthalmic surgeon to the Edinburgh Royal Infirmary, when he became full surgeon. From 1897 until the time of his death he was consulting surgeon to the same institution. He visited von Graefe in Berlin and was his student there for a few years before the latter's death in 1870.

Argyll Robertson was not a prolific writer, but was a teacher. In his early days he taught physiology and is said by one of his biographers to have introduced the important subject of Experimental Physiology, equipping his laboratory with the newest and best apparatus obtainable for this work.

He made a thorough study of the calabar bean and its uses in the treatment of eye conditions, and published the results of his investigations in a paper entitled "The Calabar Bean as a New Ophthalmic Agent," in 1863.

In 1869-70 he published papers on "Eye Symptoms in Spinal Disease" in the *Edinburgh Medical Journal*. These contributions included the pupillary phenomenon found in tabes dorsalis, which has since been inseparably linked with his name as the "Argyll Robertson Pupil," and which has made his name a familiar one to every student of medicine throughout the world.

In 1876 he published in the Royal London Ophthalmic Hospital Reports a paper on "Trephining the Sclerotic; a New Operation for Glaucoma." "A Case of Filaria Loa" was later reported by him before the Ophthalmological Society of the United Kingdom.

A list of the positions held by him and the honors conferred upon him by his confreres is an all-sufficient testimonial of the regard and esteem in which he was held by them. He was a Fellow of the Royal College of Surgeons of Edinburgh; ophthalmic surgeon to the Edinburgh Royal Infirmary, lecturer in diseases of the eye in the University of Edinburgh, president of the Royal College of Surgeons of Edinburgh; the degree of LL. D. was conferred upon him by the University of Edinburgh in 1896; he was vice-president of the Section of Ophthalmology at the meeting of the British Medical Association at Dublin in 1887, and again at the meeting in London in 1895; president of the Section at the meeting in Edinburgh in 1898; president of the Edinburgh Branch of the British Medical Association. He was honorary president of the International Ophthalmic Congress in 1888 and 1889; president of the Congress in 1894; president of the Edinburgh Medico-Chirurgical Society; president of the Ophthalmological Society of the United Kingdom; a corresponding Fellow of the New York Academy of Medicine; an honorary member of the Royal Medical Society of Edinburgh; a foreign associate of the Society of the Practicing Physicians of Prague, and an honorary member of the Neurological Society of New York.

He was surgeon-oculist to Queen Victoria in Scotland, and later to his Majesty, King Edward VII.

Argyll Robertson was a type of gentleman and physician that is becoming more and more difficult to find every year. The old school to which he belonged is, unfortunately, yielding to the relentless pressure of the newer, more aggressive, less substantial and, we might say, less desirable school of the present day, in which commercialism is playing an ever increasing part.

For a more extended account of Argyll Robertson the reader is referred to the *British Medical Journal*, January 16, 1909.

Isidor Schnabel.

Isidor Schnabel, Hofrat of the Eye Klinik of the University of Vienna since 1896, died suddenly while entering the hospital on the morning of December 4, 1908. He was born in 1842 and received his earlier ophthalmological training from E. v. Jaeger. His thesis in ophthalmology was upon "The Position and Size of the Upright Retinal Image," and attracted considerable attention in scientific circles. In 1877 he succeeded Mauthner at Innsbruck; in 1885 he went to Graz; in 1890 he succeeded Prof. Hubert Sattler at the University of Prague; and in 1896, upon the retirement of Stellwag, he entered upon the duties of his final professorship in Vienna.

Prof. Schnabel was a learned teacher and a careful scientific writer. In his thirty-one years of clinical activity, he had as students many who have since become well known in ophthalmology. Among these are Elschnig, Wintersteiner, Gruber and Lederer.

His scientific contributions were many and important, a detailed list of twenty-two of the more important ones being published in the *Centralblatt für praktische Augenheilkunde,* December, 1908.

The Section on Ophthalmology of the College of Physicians of Philadelphia, at the meeting in January, 1909, elected for the ensuing year, Dr. William Zentmayer, Chairman, and Dr. Thomas B. Holloway, Clerk.

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OCULAR THERAPY OF THE ANCIENT EGYPTIANS.*

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Washington, D. C.

Prior to 1873 our knowledge of ancient Egyptian ophthalmology was obtained principally from the writings of Celsus and other Roman and Greek oculists who had studied in Alexandria. The information thus obtained was second-hand, and naturally much altered. Not until the latter part of the 19th century was it possible to obtain exact information on this subject. In the winter of 1872-73, Ebers brought from Egypt one of the largest and best hieroglyphic manuscripts. It contained one hundred and ten pages, and gave a description of all the diseases known to Egyptians, and the remedies used for their relief. Eight pages of it are devoted to the diseases of the eyes.

Through the great discovery of this papyrus by Ebers we are enabled to read the earliest book on ophthalmology, which was written one thousand years before the time of Hippocrates, and about fifteen centuries B. C. The portion of this papyrus which treats of ophthalmology was published in Leipsic, under the title of "*Papyrus Augenkrankheiten,*" von Georg Ebers. It is a collection of prescriptions which are exactly described; and of diseases, especially of the inflammatory type, whose names are mentioned, but of which little detail is given. This oldest Egyptian book logically begins with the chief symptoms of the most frequent eye diseases; for instance, under conjunctivitis, we have redness, secretion and swelling. (A photographic copy of the original papyrus is on exhibition at the Surgeon-General's Library.)

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*Read before the Washington Therapeutical Society, December, 1908.

Ophthalmology had its origin in Egypt; and as early as fifteen centuries B. C. we have records of noted oculists. Medicine in general was practiced by the priests; the hermetic books contained the rules for its practice; and one rendered himself liable to punishment when he made use of remedies not recommended therein.

One of these hermetic books was devoted entirely to diseases of the eye. The first prescription is for the relief of the inflammation of the lids (conjunctivitis), others are for epiphora, blepharitis, etc. On page 63 are given prescriptions from a Semetic oculist; page 56, line 7, treats of the practice of iridectomy in the third century B. C. (Baker).

The following incident referred to by Herodotus shows in what esteem the Egyptian oculists were held: Cambyses, son of Cyrus, King of Persia (Herodotus, Thal. III, i. p. 198), requested Amasis, King of Egypt, to send him his best oculist to treat his mother, Kassandane, who was blind. This request was complied with by sending Nebenchari, the most famous oculist in Egypt, who remained with the royal patient until her sight was restored. Her blindness was due to senile cataract, for the relief of which the operation known as "Cutting the skin that covered the pupil of the eye," was performed.

During the oculist's stay in Persia, his King, Amasis, became afflicted in the same manner, and was operated on by Pentammon, a rival of Nebenchari, the latter being in reality the inventor of the operation. When Nebenchari heard of Pentammon's success in treating Amasis, he was convinced that he (Pentammon) had had access to his manuscript, and thereby learned the secret of the operation. He was informed later that Pentammon had destroyed this manuscript, and was deeply grieved at its loss; but it was afterwards discovered; and in it are described many remedies for diseases of the eyes which were spoken of in the sacred books of Toth, and in the writings of the famous old physicians of Byblos, as incurable.

However, the reverence of the Egyptians for anything relating to the gods would have convicted Nebenchari of sacrilege had he published his work as a correction of the books of Toth, consequently, he named his work *"Additional Writings on the Treatment of the Diseases of the Eyes, by the Great God, Toth, newly discovered by the oculist Nebenchari."* He had intended to bequeath his works to the library at Thebes, so that his successors and the afflicted might profit by his experience.

Nebenchari, who for some reason had deferred the operation on Kassandane, on hearing of the success of his rival, immediately performed the old *couching* operation, in which he was very skilful: thus leaving to Daviel the honor of having been the first to *extract* cataract. (W. H. Baker, "Ancient Egyptian Ophthalmology," Trans. Med. Soc. Virginia, 1891-92.)

We learn from Ebers that in the 13th century B. C. there existed in the great temple at Thebes a true medical college of priests. The students "when after the first grade of scribes were sent to Heliopolis" where they perfected themselves in the various branches, including surgery, diseases of the eye and diseases of the teeth; after which they returned to Thebes to practice their art. The art of ophthalmology was especially cultivated as early as fifteen centuries B. C.

In the papyrus found by Ebers (page 55) is given the treatment of the inflammatory conditions of the eye (water eye), contraction of the pupil, the fat formation in the eye, granulation, blindness of the lens (here cataract and cornea opacities are not definitely separated). The "Green eye," by which glaucoma is probably meant, white spots and nebulae which were probably due to superficial corneal opacities. The crocodile disease of the eye which Ebers thinks is pterygium, swelling of the eye, trichiasis, and other diseases not yet deciphered were observed.

The chief medicines used were incense, myrrh, salts of lead, antimony, onions, milk, verdigris, resin of acanthus, etc.

For *"Blood in the eyes,"* which probably meant an ecchymosis under the lids, caused by injuries, or subconjunctival hemorrhages, they used verdigris, antimony, powdered wood, water, also equal parts of honey, carraway and corn boiled, and the water from them applied to the eyes.

For *"Tear-eyes"* (epiphora) the remedies were incense, boiled papyrus, acacia gum, antimony and water. Another remedy for this disease consisted of:

Corn	1 part
Incense	1 part
Verdigris	1 part
Head of papyrus plant (cooked)	1 part
Resin of acanthus	1 part
Verdigris	1 part
Onions	1 part
Water	1 part

These were mixed together and put into the inside of the eye. The *"Tear-eye"* was well known to the Egyptians, and there is little doubt that what we now call "Trachoma" came under this class.

For *"Dimness of sight,"* or *"Cloudiness of the eye"* (here cataract and opacities of the cornea are not differentiated), they used, at the beginning of the inflammation, swamp water, and when the eyes showed redness, compresses of honey and antimony. For this they also used equal parts of honey and excrement from the belly of a child. These were placed in fresh milk, and afterwards placed on the eyes.

For *"Granulations,"* collyria, verdigris and onions in equal parts were mixed and applied to the eyes.

For *"Fat in the eye,"* collyria, red lead, blue vitriol, verdigris, and honey were used.

For *"Pterygium,"* sea-salt, incense, and excrement from a chicken were mixed and placed in the inside of the eye.

For *"Strabismus,"* turtle brain was laid on the eye.

For *"Heat in the eye"* (probably the sensation of heat of conjunctival irritation), beef liver was applied to the closed lids.

For any inflammatory condition of the eye, onions and antimony were recommended.

For *"Pus in the eye"* (hypopion or abscess of the cornea is probably meant), clay, ricinus leaves and honey were used.

For *"Strengthening the vision,"* mother's milk with cream is used. This was also recommended for cloudiness of the cornea and ecchymosis.

The *narrowing* of the pupil is mentioned; and was treated with frequent compresses of a solution of saltpeter and ebony chips.

There is also mentioned "*Calcification of the Meibomian gland*" (chalazion), which was termed "*Stone in the eye.*"

Another remedy for dimness of sight consisted of onions, honey and resin, mixed and placed on the eyes in the form of a plaster.

No. 62, "*For opening the sight,*" consisted of collyria, juice of fresh onions and wild honey, mixed and placed on the eyes.

A favorite eye salve was made up of collyria, goose grease, and water.

Hirsch was of the opinion that Galen's judgment, that is, that Egyptian ophthalmology consisted of "foolish stuff" was not too severe and he thought it had the character of a "coarse, empirical trade combined with the realistic and mystical dreams which had gone with all civilized nations on the threshold of history."

That Egyptian medicine did not rise above its development during the Alexandrian period is very probable, as it later fell into the hands of the Pastophors, who were an ignorant, subordinate, coarse priest caste. Egyptian ophthalmology lost its mythical character in the seventh century B. C., under Psammetich, who introduced Greek elements which brought about a new national birth of all the sciences in Egypt, and at this time ophthalmology became a free profession whose practices, however, were strictly limited to the teaching of the holy books.

1404 L Street.

WILLIAM CHARLES WELLS, AMERICAN PIONEER IN OPHTHALMOLOGY.

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William Charles Wells, M. D., F. R. S., L. & E., scientist, physician and philosopher, was born in Charlestown, South Carolina, May 25, 1757. His parents came to America from Scotland in 1753. When a mere child, he was sent to Scotland to school. At the age of fourteen he returned to Charlestown, and began the study of medicine under Dr. Alexander Garden, a prominent physician and writer of science. Young Wells then returned to Scotland and again took up his education there. In 1778 he passed all the preparatory trials, and in 1780 received the degree of doctor of medicine, at the University of Edinburgh. Wells died in London, September 18, 1817.

Wells is one of the intellects in ophthalmology. His essays are remarkable for lucid original thought, and are frequently referred to by Mackenzie and Donders; however, a better estimate of Wells' originality and scientific prophecy may be had by comparing his work with the ophthalmology of this century rather than with that of fifty years ago.

In a paper read by Wells before the Royal Society, July 4, 1811, hyperopia, the effects of belladonna on the refractive power of the eye, consensual pupillary reaction and paralysis of the accommodation were described.

Most of Wells' scientific work is in print in the transactions of British societies of science. All of his writings should be collected and put into book-form ere time effaces his name, lest America lose the honor of his genius, and as a precedent, to encourage future intellects.

Excerpts from Wells' Essays on Vision, published in 1792, are given in the following. They are set forth in the hope that Wells' entire work, not only in ophthalmology, but also in other branches of science, may be thoroughly reviewed from the view-point of today:

RAYS OF LIGHT ARE BENT IN PASSING TO THE RETINA.

"Now, a consequence of this position of the crystalline is, that, contrary to what I believe is universally maintained, no ray of light whatsoever can pass unbent to the retina from the atmosphere, or any other medium differing in refractive power from the aqueous humour."

OPTIC AXIS IS NOT VISUAL LINE.

"I am of opinion, that this line, or at least the line which we turn to objects when we see them most distinctly with one eye, is not the common axis of the globe and cornea. For I find, that, when I place the flame of a candle between either of my eyes, and a plane mirror, in such a manner that it may conceal its own image in the mirror from the sight of that eye, or rather that it may be a little below this image, but in the same vertical plane with it, the image of the flame, seen by reflection from the cornea, does not appear upon the middle point of this coat, but upon that point of it which is opposite to the center of the pupil."

OPTIC AXIS, COMMON AXIS AND VISUAL BASE.

"When a small object is so placed with respect to either eye, as to be seen more distinctly than in any other situation, I say it is then in the *optic axis*, or the axis of that eye; and if another small body be interposed between the former and the eye, so as to conceal it, and if a line joining the two be produced till it falls upon the cornea, I call this line the *optic axis*, or the axis of the eye; leaving for future determination the precise point of the cornea it falls upon, or what part of the retina receives the picture of an object which is placed in it.

"When the two optic axes are directed to a small object not very distant, they may be conceived to form two sides of a triangle, the base of which is the interval between the points of the corneas, where the axes enter the eyes; but if the object be very distant, then they may be supposed to be two sides of a parallelogram, whose base is the same interval. To avoid circumlocution, I shall call this interval the *visual base*.

"If there be drawn a line from the middle of the visual base, through the point of intersection of the optic axes, or parallel to them, if they be parallel to each other, I name it the *common axis*."

BINOCULAR SINGLE VISION. FUSION.

"As I have thus, I think, sufficiently proved, that the apparent directions of objects are governed by a law, different from any which has hitherto been thought to exist, I shall now proceed to state, in a few words, in what manner the phenomena of single and double vision with two eyes are dependant upon it.

"I formerly mentioned, that, since an object is never seen double, merely from its being seen at different distances by the two eyes, the only difficulty in explaining its single appearance consists in showing how its two visible directions may coincide, consistently with the attending phenomena. But we are enabled to do this, with the utmost ease, by the theory I have endeavored to establish. For, if the question be concerning an object at the concourse of the optic axes, I say it is seen single, because its two similar appearances, in regard to size, shape, and color, are seen by both eyes in one and the same direction, or, if you will, in two directions, which coincide with each other through the whole of their extent. It therefore matters not, whether the distance be truly or falsely estimated; whether the object be thought to touch our eyes, or to be infinitely remote. And hence we have a reason, which no other theory of visible direction affords, why objects appeared single to the young gentleman mentioned by Mr. Cheselden, immediately after his being couched, and before he could have learned to judge of distance by sight."

ACCOMMODATION AND CONVERGENCE. ORIENTATION.

"It is a fact, for which I have the authority of experiments almost without number, though I do not recollect to have seen it mentioned by any author beside Dr. Porterfield, that every change of the mutual positions of the optic axes is conjoined, in persons who do not squint, with a change of the power, in both eyes, to refract the rays of light which fall upon them. When the axes are parallel to each other, the eyes are in their lowest refracting state; but in their highest, when the axes are mutually intersected within two or three inches of the face; every intermediate inclination being also conjoined with an intermediate degree of refracting power. Now, since those objects are seen most distinctly, the radious pencils from which are accurately brought to points in the retina, it follows, that, although we employ one eye only, the same reason exists for adjusting its refractive power to their distances, as if we saw with both. When, therefore, we view a remote object with one eye, we use it in its lowest refracting state, which, I have observed, is conjoined with the widest interval of the pupils. Should we afterward attempt to see accurately a very near object, the eye will assume its highest refractive state, and the interval of the pupils be lessened; the consequence of which must be, that both the objects lying in the optic axis will appear to move in the manner already related.

"To finish this part of my subject, it seems only necessary to determine, whether the dependence of visible direction upon the actions of the muscles of the eyes be established by nature, or by custom. But facts are here wanting. As far as they go, however, they serve to prove, that it arises from an original principle of our constitution. For Mr. Cheselden's patient saw objects single, and consequently in the same directions with both eyes, immediately after he was couched; and persons affected with squinting from their earliest infancy, see objects in the same directions with the eye they have never been *accustomed* to employ, as they do with the other they have constantly used."

A MIRROR TEST IN AMETROPIA.

"For the image is now so near to the eye, that no exertion we can make is sufficient to bring its rays to a point upon the retina; the picture, therefore, upon that membrane will be formed of rays passing to a focus behind it, which is the only condition necessary for the success of the experiment. Again, if a short-sighted person should place the mirror at the distance of some feet from him, complying in other respects with Mr. Le Cat's instructions, he will constantly observe the shadow to move in the same direction with the finger. For, in his eye, the rays of the image, when at such a distance must meet before they fall upon the retina."

EXPRESSION OF EMOTIONS.

"The whole variety, then, of the expressions of feeling which are justly attributed to the eye, must, I think, depend upon its motions. Some of these are the immediate effects of certain passions; the eye, for instance, being moved differently in anger and in grief; and such may be esteemed as directly expressive of the passions by which they are produced. * * * That many of the expressions, which we attribute to the eye, do in fact depend on changes in other parts of the countenance, is evident from the alterations we think induced upon it, by the eyelashes falling off from disease, by a slight inflammation of the edges of the eye-lids, without its being communicated to the eye itself, by artificially coloring the eye-brows, and by many other similar circumstances."

A RECOGNITION OF THE SCOPE OF SPECTACLES.

"Upon the whole, I should draw this inference from what has been said, that no person, whose sight begins to grow long, ought to be, in the least, prevented from enjoying the immediate advantage which spectacles will afford him, by the fear that they will ultimately injure his eyes."

NECESSITY OF PROPER ADJUSTMENT OF SPECTACLES.

"To me it appears proper, that the glasses in spectacles, both for long and short-sighted people, should be so far asunder, that, when we look at a very remote object directly before us, our optic axes may pass exactly through their centers."

USE OF PRISMS ADVISED.

"The *second* observation is, that if flat-sided prisms were fixed in spectacle-frames, with their refracting angles toward each other, * * * "

WIDE VARIATION OF THE REFRACTING POWER.

"I formerly mentioned, that every degree of the mutual inclination of the optic axes is attended, by a particular state of the refracting power of each eye. But I must now remark that these states are sometimes subject to slight variations, while the inclinations of the optic axes to each other remain the same. * * * One instance of these variations deserves to be minutely described, as it proves, that the refractive power of the eyes is subject to greater changes, than what are shown by any experiments I have met with in authors."

175 Fifth Ave.

CHORIOIDAL HEMORRHAGE FOLLOWING OPERATIONS UPON THE GLOBE.*

Wm. Campbell Posey, M. D.,

Philadelphia.

The histories of two cases of this rare and fatal complication following operations upon the eye are as follows:

CASE I. J. McC., an Irishan, 68 years of age, was admitted to the Polyclinic Hospital, March 27, 1907, for the removal of a mature senile cataract from his left eye. I had successfully removed a cataract from his right eye three years previously, no complications occurring either at the time of the operation or during the subsequent treatment.

Although rather a free user of tobacco and alcohol, the patient appeared in good health, and though a few hyaline casts were found in his urine, albumen was absent. There was no sugar and the specific gravity equaled 1024.

The left eye having been properly prepared for operation by applications of bichloride salve for 24 hours preceding, a solution of cocaine (2%) was instilled into the eye and the patient brought into the amphitheater before the class. Coincident with the corneal incision, severe pain was experienced in and over the operated eye, but the flap was perfected, iridectomy performed, and the lens delivered without difficulty. Immediately after the removal of the lens and without apparent cause, a quantity of vitreous escaped from the eye, and a profuse hemorrhage rapidly ensued. A compress bandage was at once applied, the patient placed in a sitting posture and a hypodermic of morphine administered. The pain continuing with but little abatement, a second hypodermic was adminstered, the bandage removed from the eye, and the blood-clots which had formed between the lips of the wound carefully removed. A second compress was applied, which remained without showing signs of blood stain until the following day. Upon the following day, blood being still seen to be escaping from the eye, enucleation was advised, but this procedure was refused. Free oozing of blood still continued during the next week, when the patient, being unwilling to submit to further treatment, insisted upon leaving the hospital. An examination made of the fellow eye showed no cause for the hemorrhage in its fellow, the fundus being healthy, save for some slight degeneration of the retinal vessels. Leaving the Polyclinic Hospital, the patient came under the care of Dr. de Schweinitz, who has kindly communicated to me that the globe passed slowly into a state of phthisis bulbi, and that when last seen in December, 1907, it was white and quiet, and the fellow eye free from disease.

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*Read before the Section on Ophthalmology, College of Physicians, Philadelphia, January 21, 1909.

CASE II. In this case the chorioidal complication occurred during the performance of a sclerotomy to relieve secondary glaucoma in an eye which had been operated upon for cataract six months previously. The patient, a lady in fair health, had had lenticular opacities in each eye for ten years or more, and I had successfully removed a cataract by the combined method from the left eye four years previously, with the restoration of vision to the normal, this degree of visual acuity being still present. The operation upon the right eye was undertaken eight months ago, iridectomy being performed, and the various stages of the procedure accomplished without accident. About twelve hours after the operation, violent vomiting and retching set in as a consequence of a derangement of digestion, and at the next dressing, the outer pillar of the coloboma was found to be prolapsed forward and caught in the corneal wound. The fold of the iris was gently replaced by a spatula, but at the subsequent dressings it was noted that there was still some incarceration of the iris to the temporal side. As healing was prompt, however, and the nasal pillar of the coloboma was free, it was deemed unwise to open the wound, experience having taught that, as a rule, such slight incarcerations of the iris are harmless.

The patient was sent home from the hospital after a simple needling of a slight secondary cataract and five weeks after the operation, with the proper lenses, vision equaled 6/7½. A month later, however, a faint stippling appeared in the center of the cornea and it was noted that the intraocular tension was perceptibly raised and the temporal half of the anterior chamber shallower than usual. Pilocarpin and eserin were prescribed, and in a few days the haze of the cornea disappeared, and vision, which had been clouded, cleared again to 6/7½.

The eye remaining quiet and vision practically normal, the miotics were discontinued for a time, but were resumed again several weeks later when glaucomatous symptoms reappeared. Stronger doses of the miotics were now employed, but the glaucomatous symptoms invariably reappeared as soon as they were discontinued for any time. I then determined upon anterior sclerotomy, after the method of de Wecker, with a view to cutting through the incarcerated part of the iris and opening up the angle of the anterior chamber.

The eye was accordingly cocainized and a narrow Graefe cataract knife entered at the site of the old incision. As the knife was being slowly and cautiously pushed forward toward the limbus above, the aqueous humor gently flowing off from the anterior chamber through the lips of the incision, the patient experienced a sudden and acute pain in and over the eye. I was at once fearful of an intraocular hemorrhage, but no blood appearing in the pupil, after a solution of pilocarpin had been instilled into the eye, a firm compress bandage was applied and the patient placed in bed in a semi-recumbent position. The pain, however, still persisted and a hypodermic of morphine was administered. At the first dressing, 24 hours after the operation, the wound in the cornea was healed, and the cornea itself was clear, but the vitreous appeared hazy, and the chorioid was thought to be detached. The subsequent course has confirmed this opinion as the eye has gradually passed into a state of low-grade uveitis, with subnormal tension. But faint light perception remains. The left eye, as before stated, is quiescent. It may be remarked that the patient has a sister who developed secondary glaucoma after the removal of a cataract from one eye, and another sister with simple glaucoma.

The first case is an instance of chorioidal detachment, occasioned by more or less massive hemorrhage from that membrane. While this form of hemorrhage is fatal to the eye, sight being invariably lost and the globe usually demanding enucleation on account of shrinking or panophthalmitis, it is fortunately very rare, as the figures of Spalding attest, as in an excellent monograph which appeared in the *Archives of Ophthalmology* in 1896 (Vol. XXV, p. 92), he was able to collect but 100 cases from the entire literature up to that time. Three cases have already been reported before this Section by Drs. Risley, de Schweinitz and Jackson, and it is not unlikely that other Fellows have had similar unrecorded accidents in their practice, though it is noteworthy that many operators of large experience have never encountered it. Thus Knapp asserted at a meeting of the N. Y. Ophth. Society in 1890 that he had never seen a case in his own practice nor in that of any other surgeon. Shortly after this, however, the experience occurred to him.

Quackenboss states in the July number of the *Archives of Ophthalmology* of 1904, that among 3.624 extractions performed at the Mass. Eye and Ear Infirmary during 40 years, chorioidal hemorrhage occurred but three times. Sattler performed 1,250 extractions from 1872 to 1886 without seeing a chorioidal hemorrhage, but in the 1,869 extractions which he performed from 1886 to 1896, chorioidal hemorrhage occurred six times.

The hemorrhage may follow extraction, either with or without iridectomy, and has been precipitated by iridectomy alone, for the relief of glaucoma.

As is well recognized, the attention of the surgeon is first called to the accident by pain, either in or above the eye, or in both locations. This may manifest itself at any stage of the operation, and, as in the case which I have reported, may appear even before the section of the cornea is completed. The suffering is severe, as a rule, and there is no difficulty in differentiating it from the slight pain which is sometimes provoked by an uncomplicated extraction. The hemorrhage may follow at once, and from its volume and seriousness leaves no doubt in the mind of the operator of its source. In other cases, the pain and hemorrhage may not appear for an interval of minutes, hours or even days after the operation, but its copiousness and uncontrollability are unmistakable. Vomiting is not an infrequent accompaniment of the hemorrhage and, indeed, has been thought by some to be its cause, but is generally recognized to be but an accompanying reflex symptom. While at times the hemorrhage has occurred after vitreous prolapse or other mishap at the time of the operation, it is just as common apparently during and after operations which have been perfectly smooth and uncomplicated. The general condition of the patient, too, has seemed to exercise no determining factor in its production, for while it is true that many who lose their eye from this complication are atheromatous, and subjects of general vascular sclerosis, and many are in a more or less debilitated condition, they are not more so than the large majority of patients who successfully undergo the operation for the removal of cataract. It is of interest to note further that many of those whose eyes are lost from chorioidal hemorrhage have had a cataract removed from the fellow eye without complication either before or after that which was attended by the fatal hemorrhage.

In view of these facts, the etiology of chorioidal hemorrhage has been shrouded in obscurity, though many hypotheses, as has already been hinted at, such as complications during the operation, and general arterial sclerosis, have been advanced to explain them. All, however, are agreed in this, that whatever the predisposing cause may be, the immediate one is the lessening in the intraocular tension attending the incision into the globe, and the effect of this diminution upon the chorioidal circulation.

Until 1898, pathological evidence seemed to indicate that the hemorrhage emanated from the arteries of the chorioid, as a consequence of sclerosis of their walls which was part of a general vascular degeneration. In this year, however, Selina Bloom, of New York, who was working in Sattler's laboratory in Leipzig, published a monograph in *Graefe's Archiv. für Ophthalmologie*, in which she averred that the microscopical study which she had made of four eyes lost from chorioidal hemorrhage, indicated that the arteries of the chorioid were healthy, but that *the veins* were diseased, being the seat of phlebitis and periphlebitis, as evidenced by varicosities in their lumen and marks of degeneration in their walls and the massings of leukocytes which occurred in their immediate neighborhood. A microscopical study of the fellow eye in one instance, from which a cataract had been previously removed sucessfully, failed to reveal similar signs of venous degeneration in the chorioid, so that Bloom concluded that the varicosities as a rule are limited to one eye, thus accounting for the usual occurrence of the chorioidal hemorrhage in but one eye, and are of local origin and apparently independent of any general vascular degeneration. Dr. Bloom regretted the impossibility of studying the fundus before operation in the majority of cases of cataract, on account of the presence of the opaque lens, as she believed that such varicosities might be visible with the ophthalmoscope, in which event the surgeon would be deterred from operating.

Further microscopical studies are necessary to confirm Dr. Bloom's observations. It may be remarked, however, that Otto Becker found similar varicosities in the vessels of the interior of the eye in a case of chorioidal hemorrhage.

As might be expected from the nature of the hemorrhage, the future of the case is hopeless, for when the hemorrhage is at all extensive blindness is inevitable. As pointed out by Drs. Risley, de Schweinitz and Jackson, in their papers before this Section years ago, when the pain is complained of, the patient should at once be placed in the sitting posture, morphine and perhaps ergotin administered hypodermically, pressure applied to the eye, and if hemorrhage has occurred, all clots should be removed from the lips of the wound, to promote healing and avoid panophthalmitis. Immediate enucleation, as advised earlier, is no longer deemed necessary, as the globe in the majority of cases may be saved.

The explanation of the pain and loss of vision and shrinking of the eye in the second case is not so apparent, but may probably be explained either by a hemorrhage which occurred under the chorioid as soon as the increased tension in the glaucomatously inflamed eye was relieved by the escape of aqueous, or by the entrance of aqueous under the chorioid with perhaps some transudation of serum into the subchorioidal space through tears in the ciliary body which were made by the knife during the incision.

Fuchs has referred to this type of accident in his classic monograph upon detachment of the chorioid, both after the removal of cataract and iridectomy for glaucoma, which appeared in *Graefe's Archiv. für Ophthalmologie* in 1901 and 1902. It will doubtless be remembered that this distinguished observer grouped this form of detachment of the chorioid into four types, placing in the first group the now well-known and frequently recognized detachment which occurs not infrequently after extraction, and which is occasioned by the entrance of aqueous under the chorioid as a consequence of tears in the ciliary body. Such detachments usually appear a few days after the operation, after the clots have cleared, and the swelling occasioned by the operation has subsided sufficiently to permit the ready percolation of the aqueous under the chorioid. As a rule, this complication is without evil consequences to the eye, and the detachment after a time entirely disappears.

Fuchs considers the advanced age of cataract and glaucoma patients, the traction made upon the eye by the Graefe knife at the time of incision, and in glaucomatous subjects, the increased intraocular tension, to be predisposing factors to chorioidal detachment. In aged individuals the sclera is rigid, and after outflow of the aqueous, either air would enter the anterior chamber or the cornea would sink in, unless the entire capsule of the globe became smaller. The chorioid, however, possesses a certain degree of elasticity and contractability, so that after the outflow of the aqueous, the membrane has a tendency to contract and drags the vitreous forward. If the rigid sclera does not follow, a negative pressure thus arises in the space between sclera and chorioid, and should there be a tear in the insertion of the ciliary body a connection is established between the anterior chamber and the subchorioidal space, as a consequence of which the aqueous is sucked under the sclera. This form of chorioidal detachment may be suspected when the anterior chamber which has been restored after the operation and has returned to its normal depth, becomes shallower without any bursting open of the lips of the wound. Several days may pass before this happens, the clots and swelling of the injured tissues, as already stated, closing the tears in the ciliary body during the first few days after the operation, and only open up after these conditions subside. The prognosis is good, the chorioid going back into place when the tears in the ciliary body cicatrize.

In the second type, Fuchs points out that the fluid under the chorioid is transuded serum, as a consequence of traction upon the chorioid, in the third, blood from rupture of the chorioidal veins, and in the fourth, exudate from an inflammatory process.

When detachment has been occasioned by a hemorrhage under the chorioid, microscopical examination reveals the hemorrhagic nature of the subchorioidal fluid and after a lapse of time the inflammatory reaction of the adjoining tissues. Fuchs found, also, an encapsulation of the subarachnoid contents in all cases, which he never observed in any of those due to serous infiltration, the spaces in which the blood lay being lined with a wall of new formed connective tissue. The fibrous capsule of the suprachorioidal space lay on the external surface of the chorioid and also upon the internal surface of the sclera, and was adherent in places to these membranes. On the anterior and posterior extremities of the cavity both layers of the capsule united into a fibrous band, which extended to the ciliary body between the sclera and chorioid. Fuchs notes that he observed a similar encapsulating membrane, which he thinks is the result of a suprachorioiditis, in several cases of explosive hemorrhage, and calls attention to the fact that Bloom had noted the same occurrence in one of her cases; in fact, he considers this type of hemorrhage to be an instance, as it were, of abortive explosive chorioidal hemorrhage. Retinal detachment may or may not be present. At times the chorioid may become reattached to the sclera, but there is never full restitution to normal conditions, and the eye is practically lost.

Twenty-first and Chestnut Streets.

OPTIC ATROPHY IN SYRINGOMYELIA; CONGENITAL CATARACT WITH UNUSUAL ATROPHY OF THE IRIS FROM SECONDARY GLAUCOMA.*

Edward Adams Shumway, M. D.,

Philadelphia.

The patient, C. D., a woman aged 26 years, is at present in the Nervous Wards of the Philadelphia General Hospital, and the ocular conditions seem to be of sufficient interest to warrant my showing her to the Section. Our attention was called to her, a few weeks ago, by the Resident Physician on the eye service, Dr. Keith, and I am indebted to him for obtaining the notes of her history. She was admitted to the hospital May 4, 1906, and the history which was difficult to obtain accurately, on account of her mental condition, and contradictory statements, is very briefly as follows: Her father died of heart disease 11 years ago, her mother of consumption 10 years ago. There is no history of nervous disorder in other members of her family, and her parents were not blood relations. In her left eye she had always had poor vision, but in the right, the vision during childhood was good. She went to school until 14 years of age; for a time she wore glasses. After leaving school she was employed at housework until 17 years of age, when the vision of the right eye began to fail and at the time of admission was reduced to light perception. The left eye at this time was blind. A few months previous to entering the hospital she began to have convulsive seizures accompanied by unconsciousness, which continued for a time after admission, but so far as I have been able to determine, they have not occurred during the past year. The notes made on admission say that both eyes were prominent, the left eye was blind, and the iris could not be seen. The extraocular movements were good, and on looking to the extreme left, slight nystagmic movements appeared. There was also noted wasting of the muscles of the left hand, with fibrillary tremors. The sensations of pain and touch were normal, but there was some doubt as to the temperature sense. The convulsions were general in character, attended with unconsciousness and followed by stupor, but there was no biting of the tongue. In January, 1907, two years ago, a more careful examination was made by Dr. T. H. Weisenburg, and a diagnosis of syringomyelia was made. There was ataxia of both upper limbs, more marked on the left side. In walking without support she had a tendency to stagger to the right and backward. Grasp of the hands was poor, most affected in the left, where there was well marked atrophy of the muscles in the palm of the hand and of the interosseal muscles on the back of the hand. The hand presented the typical picture of a claw hand, with contracture. Also atrophy of the forearm and shoulder. Sensation of touch was normal but that for temperature and pain was disturbed in the left arm, chest and back. There were also changes in the lower limbs not so marked as in the upper, with absence of tendon reflexes and ataxia. The tongue was deviated to the right and beginning atrophy was noted. The facial nerve was not involved.

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*Read before the Section on Ophthalmology of the College of Physicians of Philadelphia, January 21, 1909.

Examination in March, 1907, by Dr. J. C. Knipe showed absence of light perception in both eyes. Exophthalmos both sides, most marked on the right. Paralysis of the left superior rectus; paresis of the right external rectus. Cataract in each eye. In the left eye full tension (secondary glaucoma). Right eye, tension normal. Posterior polar cataract. Atrophy of the optic nerve.

Subsequent examination by Dr. A. R. Allen in January, 1908, showed in addition partial disturbances of pain sensation in the right upper extremity.

The diagnosis is therefore syringomyelia with some bulbar symptoms showing that the spinal cord lesion has extended well upward.

At present the eyes show the following conditions: Marked exophthalmos of the right eye, with paresis of the external rectus muscle of the right eye, and of the superior rectus of the left eye. Lateral nystagmoid movements are developed in extreme excursions of the eyes to the right or left. Both eyes are without light perception. The right pupil is regular in outline, dilated to 7 mm. in ordinary light, and responds to accommodation-convergence movements. The lens shows at its posterior pole an opacity, which is horizontally oval, and about 2x3 mm. in diameter. Extending from it are a few delicate opaque lines, and in the cortex, anterior to the main opacity, are a number of small opaque dots. The media are otherwise clear. The optic nerve is pearly white, the edges are somewhat blurred, the surface is filled in, and the vessels, especially the arteries, are very narrow. The atrophy is therefore secondary to neuritis. Tension is normal. The left eyeball shows an injection of the posterior conjunctival and perforating vessels, and the tension is + 1. On first glance the iris seems to be absent. More careful examination shows a narrow band of iris tissue about ½ mm. wide, pressed against the posterior surface of the cornea, at the periphery, with a rim of uveal pigment drawn onto the anterior surface. The lens is absorbed except for a narrow disk at the posterior pole, the central part of which is occupied by a large irregularly shaped opacity, densely white in appearance. The periphery of the lens beyond the white cataract is also opaque, so that no view of the fundus is visible.

A general examination of the patient has not been made recently, according to the notes, but the involvement of the lower extremities has become more extensive, as she is rarely out of her wheel chair. There is also marked difference in the two sides of the face, due apparently to hemiatrophy of the left side. According to Schlesinger,[1] who has written a monograph upon the subject, this is usually due to involvement of the cervical sympathetic. Gowers,[2] however, believes that facial hemiatrophy is more likely due to disturbance of the fifth nerve, either from direct involvement of the nucleus or of the descending root, which extends downward in the cord to the level of the second cervical nerve. In 1905, I reported a case of facial hemiatrophy in association with optic neuritis,[3] in which I thought the facial condition was due to the involvement of the fifth nerve. The tongue also shows hemiatrophy of the right side, more advanced now than was noted by Dr. Weisenburg. There is marked deviation toward the same side and fibrillary tremor.

The case is of interest, especially on account of the optic atrophy, which is uncommon in syringomyelia, in comparison with other lesions of the cord, as tabes, and multiple sclerosis. According to Uhthoff[4] when the atrophy is primary, there is almost always a combination of tabes with syringomyelia, although at times it may be caused by direct pressure on the nerves by a coexisting internal hydrocephalus. Only three other cases of atrophy following neuritis have been reported: by Saxer,[5] Bullard and Thomas,[6] and Weisenburg and Thorington.[7] In these cases the neuritis has been explained as due to internal hydrocephalus, meningitis, or increased intracranial pressure from the presence of tumor in the neighborhood of the pons. Dr. Weisenburg, who reported one of the cases, believes that internal hydrocephalus would best explain its occurrence in the present case.

The other eye changes are probably congenital in origin, and an accidental complication, as in a case of zonular cataract reported by Schlesinger.[1] The opacity on the left side was evidently so large that it interfered with vision so much that she was unable to use the eye. What the subsequent history of the case was, is difficult to say positively, on account of the mental condition of the patient. I can elicit no history of operation to account for the absorption of the lens, so suppose this was spontaneous. For some reason, either because of a congenital defect in the formation of the angle of the chamber, which would account for the appearance of the iris, or because of later inflammatory closure of the angle, secondary glaucoma has arisen, and the eyeball has a constant high tension. The atrophy of the iris is certainly very unusual and more marked than in any case of glaucoma which I have ever seen. The involvement of the ocular muscles is due to extension of the disease process into the region of the ocular nuclei.

2007 Chestnut St.

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HOLE AT THE MACULA—REPORT OF TWO CASES.*

W. ZENTMAYER, M. D.,

PHILADELPHIA.

It is now pretty generally accepted that the condition first described by Noyes (Parsons), and later studied by Haab, to whom we owe the term *"hole at macula"* to describe this condition, is actually what this implies, and that whether the exciting cause be a traumatism, vascular disease of the retina, toxines in the vitreous, or inflammation of some portion of the uveal tract, the immediate cause is an edema of the retina with a resulting tear, except in such an unusual instance as that reported by Cohen, of which mention will be made.

I am inclined to agree with Kussel that "too much stress has been laid on the effect of edema and not sufficient upon vascular changes with resulting malnutrition and eventual atrophy," especially when the macular lesion is associated with vascular disease of the retina, as I believe that the opacity in the retina in obstructive disease of its arteries is probably due to a molecular death of the tissues.

I have seen but two cases presenting this striking picture, the one of certain traumatic origin and the other of very likely vascular origin. The first of these cases has never been reported in detail, but mention of it has been made in discussion.

CASE I. W. N., colored, aged 13 years, came to Wills Hospital in June, 1891. He had been struck in the left eye by a piece of wood one week before. He complained of intense pain in the temple. The anterior chamber was two-thirds full of blood and tension was increased. In consultation with Dr. Harlan he advised leeching and atropin. Seven days later the patient still suffering severe pain, in the absence of Dr. Harlan, Dr. Oliver advised paracentesis of the anterior chamber. This was followed by increase of hemorrhage into the anterior chamber, but tension was relieved and the patient, who had been slightly delirious, soon fell asleep. Ten days later he was discharged with normal tension. A few days later an ophthalmoscopic examination was possible and there was found a very deep glaucomatous excavation with a sharply cut circular area at the macula about the size of the head of a lead pencil, the floor of which was a little darker than the surrounding chorioid. V. = counting of fingers at 1 ft. Later the central portion became granular.

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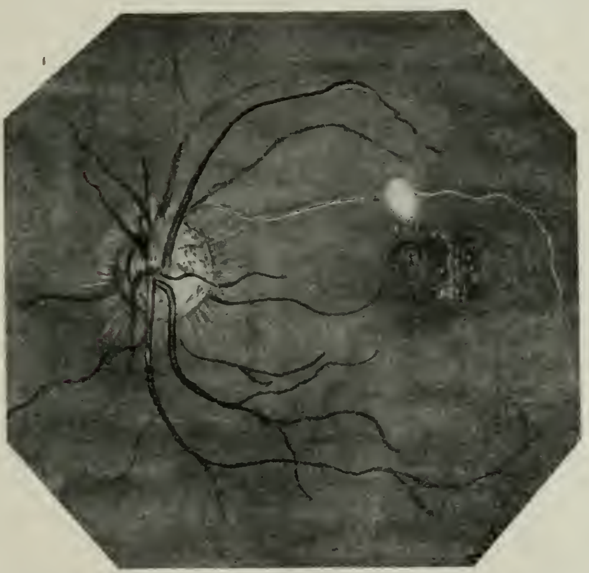
*Read before the Section on Ophthalmology of the College of Physicians of Philadelphia, January 21, 1909.

CASE II. A. H., female, colored, came to Wills Hospital January 16, 1908, complaining of poor sight in the left eye, which she had first noticed some weeks before. She denied injury, but there was an old scar on the forehead which she said she must have received in childhood. Her health is and has been good.



CASE II.—Showing hole at macula with sclerosed macular branch and connective tissue tube.

Ophthalmoscopic examination shows in O. S. clear media, disk vertically oval. The macular branch of the superior temporal artery is sclerosed and accompanied by white lines upon either side. Just above the fovea it is entirely obscured by a glistening white fluffy round mass, probably connective tissue. Beyond this, the vessel turns abruptly downward to the temporal side of the macula. The foveal region presents a sharply circumscribed perfectly round reddish brown area with a diameter of about one-third that of the disk. Its edge is faintly pigmented and most deeply at the upper margin. The surrounding retina is hazy and shows numerous shifting reflexes. These are more marked at the temporal border of the macula between the above described area and the vessel, where there is a series of vertical striations with a few scattered yellowish spots. Between the disk and the macula there is a cholesterine crystal. (Fig. 1.)

The probable explanation of these changes is that there has been an obstruction of the macular branch with malnutrition and final atrophy, or, if you prefer, an edema of the foveal region with a subsequent rupture of the distended retina.

Coates believes that macular holes are due to edema of the posterior pole, that the typical picture results when the tear involves all of the layers of the retina, but that the appearance of a hole may be produced with a defect of the inner layers of the retina alone.

Cohen (*Klin. Monatbl.*, XLVI, 1, 1908, p. 620) records a unique case of chorioidal abscess behind the macula after a perforating injury by a gun cartridge in which a perforation of the retina was seen ophthalmoscopically to take place at the fovea through which the pus poured into the vitreous. A microscopic study of the specimen leads him to believe that the peculiar vascular supply of the chorioid and the greater vulnerability of the macula because of its conformation demonstrates that the chorioid may play an important part in the etiology of this condition.

In the *Am. Jour. of Ophthal.* for August, 1908, Kipp records what is probably the first case where the lesion has been seen ophthalmoscopically before being studied microscopically. The case was one of tear of the optic nerve with a hole at the macula, the result of a shot wound passing through the orbit into the brain, the patient dying of brain abscess twelve days after the receipt of the injury. Necropsy showed that the optic nerve and its sheath had been torn by the bullet. The day after the injury the disk could not be differentiated with the ophthalmoscope from the retina, which was of a whitish color up to the visible periphery of the fundus. The retinal vessels were exceedingly narrow, except a vein which ran from the macula to the disk. At the macula was a deep red round spot in size about 1/3 the diameter of the disk. There was no l. p.

Histological study made by Alt showed that in the macular region the retina was especially swollen and the edges of the hole bent somewhat away from the chorioid into the vitreous. There was some detritus containing a few erythrocytes underlying the edges of the hole, and the pigment cells in the neighborhood were beginning to proliferate and invade the outer layers of the retina. In a series of sections the inner limiting membrane of the retina was seen as a double contoured wave line just as the lamina vitrea of the chorioid appears when ruptured. Evidences of high grade edema were visible everywhere in the retina, especially in the nerve fiber layer.

In the January number of *The Ophthalmoscope,* under the term *"Excavations of the macula with some cases showing its association with atrophy of the macular bundles,"* Butler records four cases, in none of which was there a history of an injury, and in none of which was the lesion typical. This author says, concerning the causation, that the macula is a weak spot and easily falls a prey to concussion, stretching malnutrition and inflammation.

1819 Spruce Street.

THE VISUAL ACUITY UNDER DEFINITE CONDITIONS IS AN INDEX OF THE STRENGTH OF THE NECESSARY SPHERIC LENS (PLUS OR MINUS) WHICH WILL GIVE A VISION OF 6/6 OR MORE.*

J. Thorington, A. M., M. D.,

Philadelphia.

For several years the writer has been making a careful examination of his private cases for the purpose of coming to the positive and demonstrable fact as above stated. For instance, the question which has been decided is this; if an eye is without astigmatism (or has its astigmatism corrected with a cylinder) has the ability to see 6/6, and has its ciliary muscle under the effect of a cycloplegic, what spheric lens would be required to give it normal vision?

For purposes of study the eyes selected were those which obtained standard or more than standard vision with correcting lenses, and all eyes which from any cause could not attain at least 6/6 vision were excluded from the tests and are not a part of the subject matter under consideration. To make these tests reliable, two factors were absolutely necessary, namely: the ability to read 6/6 or more, and complete cycloplegia.

To begin with, the writer had to work backward, so to speak, and in the following manner: The eyes were tested at six meters, and with the lenses which gave standard vision, the eyes were tested to find out what their visual acuities would be when plus spheres were placed in front of the correcting lenses. The spheric lenses used ranged from .25 to 2.50 in quarter diopter intervals. The resulting visions obtained are shown in the following table:

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*Read before the Ophthalmic Section, College of Physicians, Philadelphia, December 17th, 1908.

TABLE 1.

Static	refraction	with	correcting	lenses........................			Vision	6/6
"	"	"	"	"	adding	+0.25	"	6/6 -2/3
"	"	"	"	"	"	+0.50	"	6/7 -1/2
"	"	"	"	"	"	+0.75	"	6/8 -1/2
"	"	"	"	"	"	+1.00	"	6/10
"	"	"	"	"	"	+1.25	"	6/12
"	"	"	"	"	"	+1.50	"	6/15
"	"	"	"	"	"	+1.75	"	6/20
"	"	"	"	"	"	+2.00	"	6/30
"	"	"	"	"	"	+2.25	"	6/60

With+2.50 added the vision was less than 6/60.

Studying the table in reverse order it was then found that all healthy eyes, hypermetropic or myopic (or eyes with the astigmatism corrected) and under the effect of a cycloplegic required a spheric lens (plus or minus as the case might be) consistent with the visual acuity as given in this table. The interesting fact was also apparent that a + 2.50 spheric lens reduced the vision so that the "Lx" letter could not be distinguished, thus the 2.50 obscured the vision to zero, as the eye could not detect any letter at six meters. It therefore became evident that an eye with the two essential conditions mentioned, and having a vision of more than 6/60 would require a spheric lens of less strength than 2.50 and if its vision was less than 6/60 it would require a spheric lens of 2.50 or stronger.

To meet the visual conditions necessary, the author had made a series of letters on duplicate cards, and for obvious reasons called them "Metric Test Letters."* These letters conform to the tangent of the angle of five minutes and are of the Gothic character in preference to the English Block Letters. These letters are arranged in series to be seen at the varying distances as indicated in meters and the equivalent in feet. The confusion letters are conspicuous, and the two cards have corresponding letters on the same lines but differently arranged. These cards also differ from the cards in ordinary use, as there is a line of letters to be seen at 6-2/3 meters and also at 8-1/2 meters; the 25 meter lines as seen on other cards has purposely been omitted. The question is often asked why test types are not arranged so as to give a visual acuity at 55, 50, 45 and 40 meters, but the uselessness of such letters is easily understood by a review of the visual acuities just tabulated.

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*Cards furnished by Wall & Ochs, 1716 Chestnut St., Philadelphia.

The writer has, however, placed one letter on each of the cards here shown, which letters can be seen at 40 meters, but these are not a part of the test here described but will be found convenient in an office with a four meter range. It will be seen from the following table that by the arrangement of the size of the letters that the visual acuity can always be reduced to tenths as follows:

TABLE 2.

Vision	6/60	equals	1/10	Vision	6/10	equals	6/10
"	6/30	"	2/10	"	6/8 -1/2	"	7/10
"	6/20	"	3/10	"	6/7 -1/2	"	8/10
"	6/15	"	4/10	"	6/6 -2/3	"	9/10
"	6/12	"	5/10	"	6/6	"	10/10

As the visual acuity is now reducible to tenths it becomes a rule of thumb, so to speak, to calculate the strength of the corresponding spheric lens necessary to produce normal or standard vision, when it is remembered that 2.50 just reduces the vision of a standard or emmetropic eye to zero, or that plus 2.25 gives 1/10th vision. Take for instance a vision of 1/10th; that means that the eye is deficient 9/10ths or requires 9/10ths addition to give it 10/10ths or standard sight. As 1/10th of 2.50 is 0.25, then nine times 0.25 would be 2.25 the amount of spheric lens required. Or, if an eye sees the XXX meter letters it has 2/10ths vision and requires 8/10ths additional to give it 10/10ths or normal vision, namely—eight times one-tenth of 2.50 which is 2.00, plus or minus.

If the vision is 4/10ths, the eye would require 6/10ths more or 1.50 to give it standard vision. The following table, which includes the two just given, shows the strength of the spheric lens required in each instance when the visual acuity is expressed in tenths:

TABLE 3

English Feet	Meters.	Vision at six meters.	Vision in tenths.	Spheric lens required for vi/vi vision.
197.	lx	vi/lx	1/10	2.25
98.5	xxx	vi/xxx	2/10	2.00
65.6	xx	vi/xx	3/10	1.75
49.2	xv	vi/xv	4/10	1.50
39.4	xii	vi/xii	5/10	1.25
32.8	x	vi/x	6/10	1.00
27.9	viiiss	vi/viiiss	7/10	0.75
24.6	viiss	vi/viiss	8/10	0.50
21.8	vi 2/3	vi/vi 2/3	9/10	0.25
19.7	vi	vi/vi	10/10	0.00
16.4	v	vi/v	12/10	0.00
13.9	iv 1/4	vi/iv 1/4	14/10	0.00

By his previous ophthalmoscopic findings and with his retinoscope and the patient's near point, etc., the observer will know when to employ a plus or a minus spheric lens.

To make the metric test letters of value when the eyes are astigmatic, it will be necessary to correct the astigmatism with the necessary cylinder before testing the visual acuity. For this purpose the writer has also prepared metric lines in the form of the clock dial. This dial has been made in two sizes, one for five and the other for a six meter distance. These charts vary somewhat from the ordinary in that the lines from xll to vl and from lx to lll cross each other at the center. And also the Roman characters conform to the tangent of the angle of five minutes as do the lines and spaces. While using these charts it will be well to ask the patient whether the Roman characters correspond with the lines in their shade of black.

As a matter of practical experience the writer is partial to just such lines and spaces as here described, notwithstanding the fact that others recommend wider lines and spaces. In using the Metric letters and lines the writer follows the method recommended by Dr. J. S. Johnson of St. Paul, and described in the *Ophthalmic Record,* October, 1901; that is to say, to correct the astigmatism with the cylinder as the patient looks at the lines and when they all appear equally black (not necessarily distinct) then the visual acuity is taken and the necessary spheric lens employed as indicated in the above table.

To expedite matters and have the patient read the lowest line of letters which he can see without reading the letters from the top of the card, the writer makes use of the red and green strips of paper suggested by Dr. Holbrook Lowell of Boston in his description published in the *Archives of Ophthalmology,* Vol. xxxv, No. 5, 1906.

In tabulating the strength of lenses which patients select it is found to be an interesting fact, as stated by other authorities also, that about 86 per cent. of all patients coming for correcting lenses, select a lens not stronger than a four diopter sphere or cylinder or both in one or both eyes, so that this 86 per cent. could be successfully refracted with a limited number of lenses in the trial case, but the point which is still more interesting is, that nearly 70 of this 86 per cent. accept lenses of less than 2.50 and obtain a vision of 6/6 or more in one or both eyes. With these facts in mind the value of the Metric test letters and lines is self evident.

This quick method of arriving at the correct lenses may not appeal to the slow ophthalmologist who criticises "quick work as poor work", but in clinical work at least the assistant has a time-saver which he will enjoy. However, when by this method the vision has been brought to normal the ophthalmologist should not prescribe until he has verified the correction by trying various weaker spheres and cylinders (the twelve one hundredths lenses), as no provision has been made in the Metric letters for a visual acuity in fractions of less then one-tenth, as this would have necessitated additional lines of letters and a much larger card.

The Metric letters and lines may be used when practicing the "Fogging method," but as most eyes do not entirely relax the ciliary muscle when so tested, the visual acuity is liable to be one-tenth. or sometimes two-tenths more than it would be if the eye were under a cycloplegic. In presbyopic cases the Metric letters prove very satisfactory if there are no structural changes to interfere with normal vision.

TO SUMMARIZE.

1. The eye which is being tested should (ordinarily) have its ciliary muscle at rest under a reliable cycloplegic.
2. The eye must be capable of obtaining 6/6 vision or better.
3. All testing (by preference) should be done at a distance of six meters.
4. If the eye is astigmatic it must be corrected with the necessary cylindrical lens before taking the visual acuity and adding the spheric lens.
5. The visual acuity obtained if the eye is hypermetropic or myopic (or astigmatism corrected) is an index of the strength of the spheric lens required to give 6/6 vision.
6. The same lens or lenses which give a vision of 6/6 will also give a vision of more than 6/6 and without any change, if the lenses have been carefully selected and the eye is capable of seeing more than 6/6.
7. This Metric letter testing is of advantage in proving the static correction as shown in Table 1.

120 South Eighteenth Street.

A CHART FOR THE AXIS OF ASTIGMATIC GLASSES.

J. Herbert Claiborne, M. D.,

New York.

In the *New York Medical Journal,* June and July 2nd, 1892, I presented some views on the axis of astigmatism. Those views consisted partly of propositions to be verified or denied by experience, and partly of facts as developed in my practice. In that paper I set forth the initial proposition that there is no such thing as *catastrophism* in nature; that the axis of astigmatism does not occur at haphazzard; that there is a regularity in its occurrence in a given eye and that there is a certain definite relationship between the axes in both eyes when each happens to be astigmatic.

In June, 1904, before the Section on Ophthalmology of the American Medical Association, I read a paper and presented conclusions on this subject furnished by the study of 1176 cases of astigmatism taken from my private practice. The correctness of the propositions and the conclusions drawn in the first paper were found to be fully justified by experience.

The chart which is herewith presented represents those conclusions in a schematic form. The term axis of astigmatism is used synonymously with the axis of the correcting glass for convenience.

It will be observed that the arc of hyperopic astigmatism is an arc of 90 degrees; that the arc of myopic astimagtism is one of 30 degrees; and that there are two arcs of neutrality, right and left respectively, as one looks at the spectacle frame, of 30 degrees each.

There are therefore four major arcs in the circle, and they are divided into lesser arcs of 15 degrees each with the exception of several unusual arcs which will be referred to later.

THE ARC OF HYPEROPIC ASTIGMATISM.

It is well recognized by all that the axis of hyperopic astigmatism clusters around the vertical meridian.. The axis of peculiar preference is indicated by the broad line at the angle 90°, the other axes of preference are 105°, 135°, 75° and 45°. There are two secondary axes in this arc indicated by dotted lines, namely: 60° and 120°.

THE ARC OF MYOPIC ASTIGMATISM.

The axis of peculiar preference in myopic astigmatism is indicated by the broad line at the angle 180° or 0°. The secondary axes of preference lie at the angles 165° and 15°. The axes 170° and 10° are very exceptional.

THE RIGHT ARC OF NEUTRALITY.

Within this arc the axes 20° and 30° both occur and 30° occurs twice as frequently in hyperopia as in myopia, while 20° occurs alone in myopia.

THE LEFT ARC OF NEUTRALITY.

Within this arc there is but one axis, namely, 150°, and this occurs with equal frequency in myopia and hyperopia.

It will therefore be seen that with few exceptions the arc of 15° is the common factor or greatest common divisor of all arcs, both minor and major, and that the angles at which the astigmatic glass lies vary in multiples of that number.

The arcs of which 15° is not a common factor are those that lie between 30° and 20°, 20° and 15°, 15° and 10°, 10° and 0°; between 0° and 170°, and 170° and 165°. These arcs are exceptional and exist by virtue of the occurrence of the exceptional axes.

It is not my purpose to imply that others who have examined the human eye and fitted glasses for the correction of astigmatism have not found the axes of astigmatism as indicated in this chart. Indeed the merest tyro does so, but I am not aware that anyone has heretofore formulated the reason for these facts or pointed out the underlying principle that governs them.

Change is a law of the forces and facts of nature and implies motion. The law of multiples, as we know, governs the forces of gravity, of momentum, chemical change, etc., in all of which change occurs.

It is not unreasonable therefore that the law of multiples should govern the position of the axis of astigmatism, since astigmatism is a change from the normal spherical eye, being in the case of myopic astigmatism an overdevelopment, and in the case of hyperopic astigmatism, an underdevelopment or a retrogression.

That the law of multiples obtains in the above scheme is obvious. The conclusions drawn from the study of this subject may be stated thus:

1. The angles formed by the axis of astigmatism are measured in arcs of a circle.
2. The law of multiples governs the magnitude of these angles and arcs.
3. The arc of 15 degrees is the common factor of arcs, and the angles vary in multiples of this number.

By reference to the *Journal of the American Medical Association,* February 4th, 1905, it will be seen that the formulation of the above scheme is justified by the percentages which were found in the analysis of the number of cases cited.

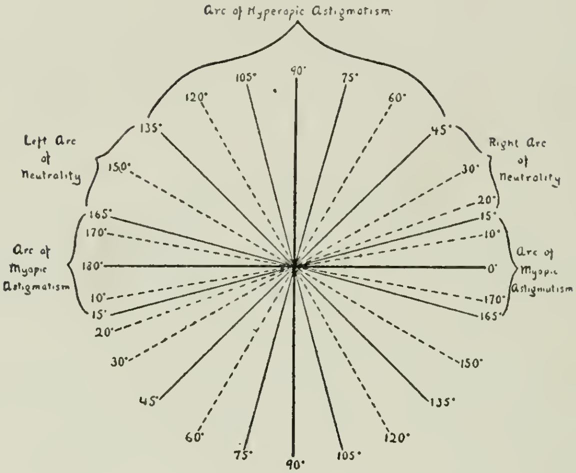
The nomenclature indicated by the trial frame ordinarily in use, in which the circle is divided into halves of 180 degrees each, with 0° starting on the right on both sides in the horizontal plane, has been employed. This is obviously the simplest and easiest method of indicating the axis of the cylinder and should be universal.

By following this scheme one can discover the axis of the astigmatism more quickly and more easily than by any other method. Those cases in which the axis occurs at angles not indicated in this scheme are in the highest degree exceptional, and I believe that those cases in which the axes have been found to lie at fractional positions, such as 90½, etc., are incorrectly diagnosed.

These conclusions have been embodied in the scheme and card herewith presented, which, for guidance in examination, may be tacked up in the refraction room.

11 East Forty-eighth Street.

DR. CLAIBORNE'S CHART OF AXIS OF ASTIGMATIC GLASSES.



Based on 1176 Cases of Astigmatism.

The scheme is based on the positions of the axes of cylinders as they occur according to the trial frame.

The arc of hyperopic astigmatism is an arc of 90°.
  Axes of Preference: 90°, 75°, 45°, 105°, 135°.
  Secondary axes: 60°, 120°.
The arc of myopic astigmatism is an arc of 30°.
  Axes of Preference: 180°, 15°, 165°.
  Secondary axes: 10°, 170°. (Highly exceptional.)

There are two neutral axes, right and left, of 30° each; each is invaded by the convex and concave cylinders; called right and left, from their positions as one looks at the trial frame.
Right arc of Neutrality:
  Axes of Preference: 30°, 20°.
Left arc of neutrality—sole axis 150°.
Convex cylinders occupy the axis 180° in 4%.
Concave cylinders occupy the axis 90° in 1.89%.

Law 1st. The angles formed by the axis of astigmatism are measured in arcs of a circle.

Law 2nd. The law of multiples governs the magnitude of these angles and arcs.

Law 3rd. The arc of 15° is the common factor of arcs and the angles vary in multiples of this number.

Journal American Medical Association, Feb. 4th, 1905.

A CASE OF AVULSIO BULBI.*

CARL WILLIAMS, M. D.,

PHILADELPHIA.

Luxation of the bulb is a relatively common occurrence, but few examples of avulsion of the eyeball seem to be found in ophthalmic literature. Since for many years no distinction was made by ophthalmic writers between these two conditions, a search of the records for reported cases of "avulsio bulbi" has proven rather difficult, if not inaccurate. Many writers mention neither condition, others mention luxation only. A few, more recently, sharply distinguish between the two conditions.

While luxation may occur spontaneously, in avulsion traumatism is necessary. The force is usually applied according to the law of the lever and fulcrum. A foreign body entering the orbit, employs the orbital margin as a fulcrum, and tears the globe from its resting place, rupturing the optic nerve and a majority of the ocular muscles.

I have been able to find but few recorded cases, and of these the majority were incomplete, the bulb being still attached to the orbit by conjunctiva or one or more ocular muscles. The instruments employed in producing this distressing condition are various. "Gouging" is said to be a common practice among the natives of Central Africa, resulting frequently in luxation and probably, at times, in avulsion. Older European writers make the same statements concerning a similar condition among the negroes of our Southern States, but I am unable to verify these statements.

Fulton[1] in 1887 reported a case of self-enucleation of both eyes in an insane person, the bulbs being loose in the conjunctival sac and the lids closed behind them. The recti muscles and optic nerves were ruptured. This condition was produced by the thumbs of the insane patient.

Dehn[2] also mentions a collection of five similar cases of self-enucleation in the insane, with more or less harm to the recti muscles and nerve.

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*Read before the Section on Ophthalmology, College of Physicians of Philadelphia, February 18, 1909.

Mackinlay[3] in 1887 reported a case of self-enucleation of the eyeball.

Gueniat[4] mentions two cases of avulsion in the new-born. Of the cases of avulsion produced directly by accident, one was caused by a fall under a wagon wheel[5], another by a blow from a stick[6], another by a fall upon a blunt hook[7], and two others by meat hooks[8].

Barch refers to a case of avulsion caused by the tusk of a boar[9], and reports a similar accident caused by a fall upon a stone[10]..

Cooper refers to two cases, one caused by a fall upon a piece of wood[11], and the other by a rifle bullet[12].

Sterling's[13] case was produced by a fall upon a crow-bar standing upright in the ground.

Four well-known cases were caused by falls upon the handles of keys.[14] The most famous of these occurred in a French fisherman, who, returning home one night in a drunken condition, fell against the key in the door. Upon rising in the morning he, for the first time, discovered the accident, and search disclosed the injured bulb lying upon the floor.

The case of avulsio bulbi, which I wish to present, occurred in J——— G———, a patient of Dr. Walter Kremer, by whom I was called in consultation. The patient, a man of sixty years of age, gave the following history: Just after nightfall on the day of consultation, while driving home and proceeding at an ordinary gait, he was compelled to turn aside in order to avoid a plumber's wagon drawn up at the curb. From the rear of the wagon and unseen in the dusk by the patient, protruded at an oblique angle, several feet of gas pipe. The patient as he was about to pass the wagon was conscious only of a sudden blow and pain in the right eye, followed by hemorrhage. A bandage was at once obtained and applied by his companion, and they together proceeded home. Upon removing the bandage two hours later, I found two rather clean-cut wounds corresponding to the margins of the supra- and infraorbital arches, the superior and longer one being about one inch in length. The globe itself was found lying uninjured upon the cheek, being connected with the orbit by the external rectus muscle alone. The optic nerve was severed about seven millimeters behind the bulb. The remaining rectus was cut and the bulb detached, the wounds and orbit cleaned, a stitch taken in the lower and more incised wound and a bandage applied. Healing took place with some cicatricial contraction from the wounds at the orbital margin, making the use of a prothesis uncomfortable.

5909 Germantown Ave.

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HEREDITARY BLINDNESS AND ITS PREVENTION.

Clarence Loeb, A. M., M. D.,

ST. LOUIS, MO.

(*Continued from the April Number.*)

APPENDIX B.

References to four hundred and ninety-six cases of hereditary blindness.

Ectopia Lentis.

I. Adamück. (4)

Congenital dislocation of the lens is frequently found in several members of the same family.

II. Baretto. (23)

2 children with ectopia lentis.

(Collateral heredity, 1 family; 2 children, both affected.)

III. Becker. (30)

- I. (?), (?), 2 children.
- II. a female, ectopia lentis bilateral, 2 children.
  - b female, ectopia lentis bilateral, no children.
- III. a male, ectopia lentis bilateral.
  - b female, ectopia lentis bilateral.

(Collateral heredity, 1 family; 2 children, both affected. Direct heredity, 1 family; mother and 2 children affected.)

IV. Bresgen. (54)

- I. female, poor vision since child, 1 child.
- II. male, normal, 3 children.
- III. a male, normal, 1 child.
  - b female, ectopia lentis bilat., no children.
  - c female, ectopia lentis bilat., 6 children.

IV.

Children IIIa.

a male, ectopia lentis bilat.

Children IIIc.

6 (?), ectopia lentis bilat.

(The taint started probably as collateral heredity, 1 family; 3 children; 2 affected, 1 not. Direct heredity, 1 family: mother and 6 children affected. Indirect heredity, 1 family; 1 child affected.)

V. Damianos. (81)

1 brother and 2 sisters congenital bilat. ectopia lentis et pupillae.

(Collateral heredity, 1 family; 3 children, all affected.)

VI. DeBenedetti. (86)

Father and 3 children had congenital aniridia, followed by ectopia lentis, glaucoma and blindness; 1 son had small coloboma iridis, otherwise normal.

(Direct heredity, 1 family; father affected; 4 children; 3 affected, 1 not.)

VII. Dixon. (94)

Mother and 3 sons had ectopia lentis bilat.; 3 children normal.

(Direct heredity, 1 family; mother affected; 6 children; 3 affected, 3 not.)

VIII. Eha. (104)

Cases from the Tübingen eye clinic.

(A, B) 2 out of 4 children had ectopia lentis bilat.

(Collateral heredity, 1 family; 4 children; 2 affected, 2 not.)

(D) Father, son and daughter ectopia lentis.

(Direct heredity, 1 family; father and 2 children affected.)

(J, K) Father and 2 children had ectopia lentis; 2 children died shortly after birth; state of eyes unknown.

(Direct heredity, 1 family; father and 2 children affected; 2 others not counted.)

(L) 3 children ectopia lentis congen. bilat.; 2 children normal.

(Collateral heredity, 1 family; 5 children; 3 affected, 2 not.)

(T) Patient had bilat. cong. ectopia lentis. His mother and a maternal uncle had the same. 1 brother and 1 sister normal.

(Direct heredity, 1 family; mother affected; 3 children; 1 affected, 2 not. Collateral heredity, 1 family; 2 children affected.)

Other cases are not statistically available.

IX. Fleischer. (116)

A family with congenital ectopia lentis in 3 generations.

X. Frickhöffer. (123)

Mother very myopic; father oval pupils, oblique but central; 2 daughters oval pupils, misplaced inwards and downwards and ectopia lentis; 1 son, oval pupils misplaced outwards and upwards and ectopia lentis.

(Collateral heredity, 1 family; 3 children; all affected.)

XI. Friebis. (124)

Quotes several cases from other authors.

XII. Ginestous. (141)

Mother, son and 1 daughter had congenital ectopia lentis; 1 daughter had normal eyes.

(Direct heredity. 1 family; mother affected; 3 children; 2 affected, 1 not.)

XIII. Ginestous. (142)

A 12-year-old boy, mother, and her sister had ectopia lentis.

(Direct heredity, 1 family; mother and 1 child affected. Collateral heredity, 1 family; 2 children, both affected.)

XIV. v. Graefe. (150)

(A) Brother and sister congenital ectopia lentis.

(Collateral heredity, 1 family; 2 children, both affected.)

(B) Father and daughter bilat. cong. ectopia lentis.

(Direct heredity, 1 family; father and 1 child affected.)

XV. Keyser. (215)

I. male, ectopia lentis, 4 children.
II. a female, ectopia lentis, 4 children.
3 males, ectopia lentis, no children.
III. 4 (?), ectopia lentis.

(Direct heredity, 2 families; 1 father and 1 mother affected; 8 children, all affected.)

XVI. Lewis. (251)

I. female, ectopia lentis, 3 children.
II. a male, ectopia lentis, no children.
b female, normal, 7 children.
c male, ectopia lentis, 4 children.

III.
Children IIb.
a male, ectopia lentis, no children.
b male, ectopia lentis, no children.
c, d, e, f, males, normal, no children.
g female, normal, no children.
Children IIc.
h male, normal, 2 children.
i male, ectopia lentis, no children.
j female, ectopia lentis, 1 child.
k female, ectopia lentis, 3 children.

IV.
Children IIIh.
a, b females, normal, no children.
Children IIIj.
c female, normal, no children.
Children IIIk.
d female, normal, 1 child.
e female, normal, 4 children.
f female, ectopia lentis, 2 children.

V.

Children IVd.

- a male, normal, 2 children.

Children IVe.

- b male, normal, no children.
- c, d male, ectopia lentis, no children.
- e female, ectopia lentis, no children.

Children IVf.

- f female, normal, no children.
- g female, ectopia lentis, 3 children.

VI.

Children Va.

- 2 males, normal.

Children Vg.

- 2 females, ectopia lentis.
- 1 male, ectopia lentis.

(Direct heredity, 6 families; 5 mothers and 1 father affected; 16 children; 10 affected, 6 not. Indirect heredity, 2 families; 11 children; 5 affected, 6 not.)

XVII. Little. (254)

- 2 cousins, ectopia lentis.

(Not statistically available.)

XVIII. Marlow. (282)

Patient buphthalmus right eye, ectopia lentis left eye; 2 sisters, 1 brother and father congenital ectopia lentis; son of sister also ectopia lentis.

(Direct heredity, 2 families; 1 father and 1 mother affected; 5 children, all affected.)

XIX. Miles. (289)

Mother, 3 sons and 3 daughters, bilat. ectopia lentis; 1 son and 1 daughter normal.

(Direct heredity, 1 family; mother affected; 8 children; 6 affected, 2 not.)

XX. Morton. (299)

I. male, ectopia lentis, 8 children.

II. a male, ectopia lentis, 6 children.

- b male, ectopia lentis, no children.
- 6, (?), normal, no children.

III. a female, ectopia lentis, 7 children.
5 (?), normal, no children.
IV. a male, ectopia lentis, 4 children.
b male, ectopia lentis, 3 children.
c male, ectopia lentis, no children.
4 (?), normal, no children.
V.
Children IVa.
2 (?), ectopia lentis.
2 (?), normal.
Children IVb.
1 male. ectopia lentis.
2 females, normal.

(Direct heredity, 5 families; 4 fathers and 1 mother affected; 28 children; 9 affected, 19 not.)

XXI. Mules. (302)

Father ectopia lentis; 8 children same; 2 others died young, condition of eyes unknown—not counted. The mother married a second time and all of her children by her second husband had normal eyes.

(Direct heredity, 1 family; father and 8 children affected.)

XXII. Parker. (332)

Grandmother, mother and 3 children, ectopia lentis.

(Direct heredity, 2 families; 2 mothers affected; 4 children, all affected.)

XXIII. Paton. (334)

Brother and sister ectopia lentis.

(Collateral heredity, 1 family; 2 children, both affected.)

XXIV. Peltesohn. (335)

Slight bilateral ectopia lentis in grandmother, grand aunt, father and daughter.

(Direct heredity, 2 families; 1 father and 1 mother affected; 2 children, both affected. Collateral heredity, 1 family; 2 children, both affected.)

XXV. Rabinowitsch. (355)

Brother and sister bilateral congenital ectopia lentis.

(Collateral heredity; 1 family; 2 children, both affected.)

XXVI. Sattler. (383)

(A) Mother and son bilateral congenital ectopia lentis.

(B) 3 children bilateral congenital ectopia lentis.

(Direct heredity, 1 family; mother and 1 child affected. Collateral heredity, 1 family; 3 children, all affected.)

XXVII. Schmidt-Rimpler. (396)

I. male, ectopia lentis, (?) children.
II. a female, ectopia lentis, 1 child.
(?), (?), normal.
III. male, ectopia lentis, 8 children.
IV. 4 male, ectopia lentis.
1 female, ectopia lentis.
3 (?), normal.

(Only IV generation can be used statistically. Direct heredity, 1 family; father affected; 8 children; 5 affected, 3 not.)

XXVIII. Sippel. (412)

Sippel, himself, his mother and 1 brother had ectopia lentis.

(Direct heredity, 1 family; mother and 2 children affected.)

XXIX. Sous. (421)

2 children congenital ectopia lentis.

(Collateral heredity, 1 family; 2 children, both affected.)

XXX. Starkey. (424)

Mother and 7 children ectopia lentis.

(Direct heredity, 1 family; mother and 7 children affected.)

XXXI. Thompson. (447)

2 brothers ectopia lentis.

(Collateral heredity, 1 family; 2 children, both affected.)

XXXII. Tiffany. (452)

Father and 7 out of 9 children had ectopia lentis.

(Direct heredity, 1 family; father affected; 9 children; 7 affected, 2 not.)

XXXIII. Wild. (480)

4 cases congenital dislocation lens in one family.

(Not statistically available.)

XXXIV. Wilder. (481)

Mother and 2 out of 4 children had ectopia lentis.

(Direct heredity, 1 family; mother affected; 4 children; 2 affected, 2 not.)

XXXV. Williams. (482)

(A) Mother and brother ectopia lentis; 3 children normal.

(B) Father, son and daughter ectopia lentis.

(Direct heredity, 2 families; 1 father and 1 mother affected; 5 children; 2 affected, 3 not. Collateral heredity, 1 family; 2 children, both affected.)

XXXVI. Wordsworth. (488)

I. female, ectopia lentis, 2 children.
II. a male, ectopia lentis, 2 children.
b male, ectopia lentis, 1 child.
III.
Children IIa.
1 male, ectopia lentis.
1 female, ectopia lentis.
Children IIb.
1 male, ectopia lentis.

(Direct heredity, 3 families; 1 mother and 2 fathers affected; 5 children; all affected.)

XXXVII. Worth. (489)

Ectopia lentis in 5 generations.

(Not statistically available.)

XXXVIII. Zirm. (494)

2 children ectopia lentis.

(Collateral heredity, 1 family; 2 children, both affected.)

FAMILY DEGENERACY OF THE CORNEA.

I. Doyne and Stephenson. (99)

Paternal grandmother had bad eyes from youth. Father and 4 of his 8 children had opacities of the cornea.

(Direct heredity, 1 family; father affected; 8 children; 4 affected, 4 not.)

II. Fehr. (108)

Reports a family of 6 children, 3 of whom had corneal opacities at the age of 10; 3 others normal.

(Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

III. Fehr. (109)

Reports 27 cases in 6 families up to the present time. In addition, patient, his mother, both of her brothers and at least 2 of their children were affected.

(Direct heredity, 1 family; mother and child affected. Collateral heredity, 1 family; 3 children, all affected. The other cases cannot be used statistically.)

IV. Fleischer. (116)

Reports 24 cases of corneal opacities in 11 families.

(Not statistically available.)

V. Freund. (121)

(A) 2 brothers had corneal opacities, and each had a son so affected; a third brother was also affected; a fourth brother had poor vision—cause not stated—and had 2 sons affected.

(Collateral heredity, 1 family; 3 brothers, all affected—fourth not counted. Direct heredity, 2 families; 2 fathers affected; 2 children, both affected. Indirect heredity. 1 family; 2 children, both affected.)

(B) I. female, corneal opacities, 5 children.
  II. a female, corneal opacities, 1 child.
    b female, corneal opacities, 1 child.
    c female, corneal opacities, 1 child.
    d female, corneal opacities, 2 children.
    e male, normal, no children.
 III.
 Children IIa.
    a male, corneal opacities, no children.
 Children IIb.
    b female, corneal opacities, no children.
 Children IIc.
    c female, corneal opacities, no children.
 Children IId.
    d male, corneal opacities, 3 children
    e female, corneal opacities, no children.
 IV. a male, corneal opacities.
    2 (?), normal.

(Direct heredity, 6 families; 5 mothers and 1 father affected; 13 children; 10 affected, 3 not.)

VI. Fuchs. (130)

(A) 2 brothers corneal opacities.

(B) Father and son corneal opacities.

(Collateral heredity, 1 family; 2 children affected. Direct heredity, 1 family; father and 1 child affected.)

VII. McNab. (259)

3 out of 6 children congenital opacities of the cornea.

(Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

VIII. Oliver. (323)

Mother and son had symmetric corneal opacities.

(Direct heredity, 1 family; mother and 1 child affected.)

IX. Rochat. (372)

6 members of one family, all males, corneal degeneration.

(Not statistically available.)

X. Spicer. (422)

Father and daughter hereditary nodular opacities of the cornea; also brother and sister of father.

(Direct heredity, 1 family; father and 1 child affected. Collateral heredity, 1 family; 3 children, all affected.)

XI. Spitta. (423)

Reports 20 cases in 8 families characterized by the participation of 2 or more members in a disease of the cornea, consisting of the formation of irregular spots in its outermost layers.

(3, 4) 2 children affected, 5 not.

(5, 6, 7) 3 children affected, 1 not.

(Collateral heredity, 2 families; 11 children; 5 affected, 6 not.)

(8, 9, 10, 11)

I. a (?), corneal opacities, 11 children.
   b male, corneal opacities, 10 children.
   c male, normal, no children.
II.
Children Ia.
   all normal.
Children Ib.
   2 (?), corneal opacities.
   8 (?), normal.

(Collateral heredity, 1 family; 3 children; 2 affected, 1 not. Direct heredity, 2 families; 2 fathers affected; 21 children; 2 affected, 19 not.)

(12, 13) Father affected; 10 children normal; 3 sisters similarly affected; 3 normal.

(14, 15, 16, 17).

I. (?), normal, (?) children.
II. a (?), normal, 2 children.
   b (?), normal, 2 children.
   (?) (?), (?), (?) children.

III. All children have corneal opacities. They are double first cousins.

(Direct heredity, 1 family; father affected; 10 children, all normal. Collateral heredity, 3 families; 11 children; 8 affected, 3 not.)

(18, 19, 20).

Patient, a brother, their father, 1 grandnephew, 1 grandniece and their mother who came from another family, all had corneal degeneration.

(Direct heredity, 2 families; 1 father and 1 mother affected; 4 children, all affected.)

XII. Veasey. (460)

Brother and sister about same age developed corneal degeneration.

(Collateral heredity, 1 family; 2 children, both affected.)

GLAUCOMA.

I. Arlt. (14)

(A) Mother and 2 daughters glaucoma.

(B) Mother and 1 daughter glaucoma.

(C) Father and 3 sons glaucoma.

(Direct heredity, 3 families; 1 father and 2 mothers affected; 6 children, all affected.)

II. DeBenedetti. (86)

Father and 3 children had ectopia lentis followed by glaucoma; 1 son, small coloboma iridis, otherwise normal.

(Direct heredity, 1 family; father affected; 4 children; 3 affected, 1 not.)

III. v. Graefe. (153)

"Heredity plays a very important role in glaucoma, especially the typical inflammatory glaucoma, which has frequently been observed to affect several members of a family. I have observed that when several successive generations have been affected, the appearance of the disease is advanced to the middle and first half of life. Several families now live in Berlin where the disease has involved three, four and even more generations. The present sufferers are only in their thirties, while their parents and grandparents were affected in their fifties and sixties. There was one case where the disease appeared simultaneously in mother and daughter. Hereditary taint seems much less pronounced in glaucoma simplex.

(Not statistically available.)

IV. Harland. (168)

I. male, glaucoma, 1 child.
II. male, glaucoma, 1 child.
III. male, glaucoma, 5 children.
IV. a female, glaucoma, 1 child.
2 (?), glaucoma.
2 (?), normal.
V. female, glaucoma.

(Direct heredity, 4 families; 3 fathers and 1 mother affected; 8 children; 6 affected, 2 not.)

V. Howe. (194)

I. male, glaucoma, age 40, 6 children.
II. a female, normal, no children.
b male, glaucoma, age 28, 5 children.
c female, glaucoma, age 25, 4 children.
3 (?), normal, no children.
III.
Children IIb.
2 females, glaucoma.
1 male, glaucoma.
2 (?), normal.
Children IIc.
2 males, glaucoma.
2 (?), normal.

Disease began at 17-28 in III generation.

(Direct heredity, 3 families; 2 fathers and 1 mother affected; 15 children; 7 affected, 8 not.)

VI. Jacobson. (200)

Father glaucoma simplex at age 70; 2 daughters same at age 40 and 45.

(Direct heredity, 1 family; father and 2 children affected.)

VII. Jules. (207)

Mother complete congenital aniridia left eye; right enucleated on account glaucoma; daughter complete aniridia left eye; right eye glaucomatous.

(Direct heredity, 1 family; mother and 1 child affected.)

VIII. Kauffmann. (211)

I. normal, 2 children.
II. a male, glaucoma, 4 children.
b female, glaucoma, 1 child.
III.
Children IIa.
a female, glaucoma, no children.
b, c female, normal, all descendants normal.
d male, glaucoma, 1 child.

Children IIb.
e female, normal, no children.
IV. female, glaucoma, 5 children.
V. a female, glaucoma.
4 (?), normal.

(Direct heredity, 4 families; 2 fathers and 2 mothers affected; 11 children; 4 affected, 7 not. Collateral heredity, 1 family; 2 children, both affected.)

IX. Kummer. (225)

I. 4 out of 6 glaucoma.
II. 5 out 16 glaucoma.

(Collateral heredity, 1 family; 6 children; 4 affected, 2 not. II generation not statistically available.)

X. Lawford. (240)

(A) I. male, unknown, 13 children.
II. a female, glaucoma, 7 children.
12 (?), normal, (?) children.
III.
Children IIa.
a female, normal, 5 children.
b female, glaucoma, 6 children.
c female, glaucoma, no children.
d male, normal, no children.
e male, glaucoma, no children.
f, g females, normal, no children.
IV. all below 30 years.

(Direct heredity, 1 family; mother affected; 7 children; 3 affected, 4 not.)

(B) I. (?), normal, 10 children.

II. a, e, g, h males, normal, no children.
i, j females, normal, no children.
b male, glaucoma, 2 children.
f male, glaucoma, no children.
c female, normal, 2 children.
d female, normal, 10 children.

III.

Children IIb.
a, b (?), normal, no children.

Children IIc.
c, d (?), normal, no children.

Children IId.
e male, glaucoma, no children.
f male, glaucoma, no children.
g male, glaucoma, no children.
h male, glaucoma, 5 children.
6 (?), normal.

IV. 5 All below 25 years.

(Direct heredity, 1 family; father affected; 2 children normal. Collateral heredity, 1 family; 10 children; 2 affected, 8 not. Indirect heredity, 1 family; 10 children; 4 affected, 6 not.)

(C) I. female, glaucoma, 12 children.

II. a female, glaucoma.
b female, glaucoma.
6 (?), normal.
4 (?), unknown—not counted.

(Direct heredity, 1 family; mother affected; 8 children; 2 affected, 6 not.)

(D) 2 brothers and 1 sister, glaucoma.

(E) 1 brother and 1 sister, glaucoma.

(Collateral heredity; 2 families; 5 children, all affected.)

(F) Father glaucoma; son prodromal symptoms; vague history of other cases in the family.

(Not statistically available.)

Conclusions—

(1) Anticipation usually present.

(2) Heredity usually in the chronic form, may be present in acute.

(3) Both sexes transmit about equally.
(4) Males slightly more often affected.

XI. Mooren. (295)
(A) Glaucoma in 2 sisters.
(B) Glaucoma in 3 children.

(Collateral heredity, 2 families; 5 children, all affected.)

XII. Mules. (301)

Father glaucoma right eye, age 49; 1 son glaucoma left eye, 16 years; 1 son glaucoma right eye, 18 years.

(Direct heredity, 1 family; father and 2 children affected.)

XIII. Muler-Kannenberg. (306)

Father and daughter glaucoma.

(Direct heredity, 1 family; father and 1 child affected.)

XIV. Nettleship. (310)
(A) I. male, glaucoma, 4 children.
II. a, b male, normal, no children.
c female, glaucoma, 3 children.
d female, normal, no children.
III. a male, normal, 3 children.
b female, glaucoma, 1 child.
c female, normal, 1 child.
V. All below 15 years of age.

(Direct heredity, 2 families; 1 father and 1 mother affected; 7 children; 2 affected, 5 not.)

(B) Father chronic glaucoma, age 60; 2 sons and 2 daughters chronic glaucoma, 40-55 years; 5 children normal.

(Direct heredity, 1 family; father affected; 9 children; 4 affected, 5 not.)

(C) I. a female, glaucoma, 1 child.
b female, glaucoma.
c, d males, glaucoma.
6 (?), normal.
II. a male, glaucoma.

(Collateral heredity, 1 family; 10 children, 4 affected, 6 not. Direct heredity, 1 family; mother and 1 child affected.)

XV. Nolte. (319)

2 brothers glaucoma simplex; 1 sister normal; son of one of the brothers so far normal.

(Collateral heredity, 1 family; 3 children; 2 affected, 1 not. Direct heredity, 1 family; father affected; 1 child normal.)

XVI. Pagenstecher. (327)

(1) Mother and 3 sons glaucoma.

(2) Father and son glaucoma.

(Direct heredity, 2 families; 1 father and 1 mother affected: 4 children, all affected.)

XVII. Pflüger. (340)

2 brothers, age 19 and 20, had glaucoma simplex.

(Collateral heredity, 1 family; 2 children, both affected.)

XVIII. Rampoldi. (361)

Mother and daughter glaucoma.

(Direct heredity, 1 family; mother and 1 child affected.)

XIX. Rampoldi. (362)

Demonstrated heredity, in 3 out of 228 cases of primary glaucoma.

(Not statistically available.)

XX. Ray. (366).

Mother and 2 daughters glaucoma. Several other cases of glaucoma not given in detail.

(Direct heredity, 1 family; mother and 2 children affected.)

XXI. Rognan. (374)

I. female, glaucoma, 1 child.
II. female, glaucoma, 11 children.
III. 3 males, glaucoma.
4 males, normal.
4 females, normal.

(Direct heredity, 2 families; 2 mothers affected; 12 children; 4 affected. 8 not.)

XXII. Rudin. (379)

I. female, glaucoma, 1 child.
II. male, glaucoma, 2 children.
III. 2 male, glaucoma.

(Direct heredity, 2 families; 1 father and 1 mother affected; 3 children, all affected.)

XXIII. Schenkl. (388)

Mother glaucoma right eye, age 81; left eye, age 60: 1 son and 2 daughters glaucoma left eye, age 60.

(Direct heredity, 1 family; mother affected; 3 children, all affected.)

XXIV. Schmidt. (395)

Glaucoma is inherited in a number of cases.

XXV. Schweigger. (403)

Father and brother glaucoma; son also glaucoma.

(Collateral heredity, 1 family; 2 children, both affected. Direct heredity, 1 family; father and 1 child affected.)

XXVI. Smith. (414)

Father and daughter glaucoma both eyes.

(Direct heredity, 1 family; father and 1 child affected.)

XXVII. Somya. (420)

Father glaucoma, married 3 times; children first wife, son normal, daughter glaucoma; children second wife, none; children third wife, son and daughter chronic glaucoma.

(Direct heredity, 1 family; father affected; 4 children; 3 affected, 1 not.)

XXVIII. Stellwag. (426)

Mother, her brother, and daughter had glaucoma.

(Collateral heredity, 1 family; 2 children, both affected. Direct heredity 1 family; mother and 1 child affected.)

XXIX. Story. (434)

Mother and son chronic glaucoma.

(Direct heredity, 1 family; mother and 1 child affected.)

XXX. Wood. (487)

I. (?), normal, 6 children.
II. a male, glaucoma, no children.
  b male, glaucoma, 4 children.
  c female, glaucoma, 7 children.
  3 (?), normal, no children.
III.
Children IIb.
  1 female, cataract, no glaucoma.
  3 female, normal.
Children IIc.
  2 females, glaucoma.
  5 (?), normal.

(Direct heredity, 2 families; 1 father and 1 mother affected; 11 children; 2 affected, 9 not. Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

MEGALOPHTHALMUS.

I. Best. (39)

Mother and son megalophthalmus.

(Direct heredity, 1 family; mother and 1 child affected.)

II. Johnson. (205)

Mother normal; father amaurosis, left eye, due to calcareous lens; 3 oldest children normal; next 3 had buphthalmus.

(Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

III. Jüngken. (208)

Parents normal; 7 sons keratoglobus; 2 daughters normal.

(Collateral heredity, 1 family; 9 children; 7 affected, 2 not.)

IV. Paly. (329)

(1) 2 children buphthalmus.
(2) 2 children buphthalmus.
(3) 2 children buphthalmus.
(4) 2 children buphthalmus; 1 near sighted; 1 normal.

(Collateral heredity, 4 families; 10 children; 8 affected, 2 not.)

V. Streatfield. (438)

2 sisters buphthalmus.

(Collateral heredity, 1 family; 2 children, both affected.)

VI. Venneman. (463)

Buphthalmus can be inherited.

VII. Zahn. (491)

Collateral heredity of buphthalmus relatively frequent.

NYSTAGMUS.

I. Alt. (9)

I. male, myopia, 5 children.
II. a male, nystagmus, 8 children.
  b male, nystagmus, no children.
  c female, nystagmus, 3 children.
  d, e females, normal, no children.
III.
Children IIa.
  a, b, c females, nystagmus, no children.
  d, e, f, g, h (?), normal.
Children IIc.
  i, j males, nystagmus, no children.
  k male, nystagmus, 2 children.
IV.
Children IIIk.
  2 (?), normal.

(Collateral heredity, 1 family; 5 children; 3 affected, 2 not. Direct heredity, 3 families; 2 fathers and 1 mother affected; 13 children; 6 affected, 7 not.)

II. Aubineau. (19)

3 children with nystagmus and retinitis pigmentosa.

(Collateral heredity, 1 family; 3 children, all affected.)

III. Benson. (33)

Mother and son congenital nystagmus, irideremia, microphthalmus, and cataract both eyes.

(Direct heredity, 1 family; mother and 1 child affected.)

IV. Boehm. (48)

Tendency towards albinism and nystagmus in increasing degree in grandmother, mother and daughter.

(Direct heredity, 2 families; 2 mothers affected; 2 children, both affected.)

V. Boulland. (51)

Grandmother, grandaunt and 6 grandchildren had nystagmus.

(Indirect heredity, 1 family; 6 children, all affected. Direct heredity, 1 family; mother affected; 1 child not affected. Collateral heredity, 1 family; 2 children, both affected.)

VI. Bronner. (55)

Father and 4 children microphthalmus, cataract and nystagmus; 4 children normal eyes.

(Direct heredity, 1 family; father affected; 8 children; 4 affected, 4 not.)

VII. Burton. (62)

I. normal, 7 children.
II. a male, nystagmus, no children.
  b female, normal, no children.
  c male, nystagmus, 4 children.
  d male, nystagmus, no children.
  e male, normal, no children.
  f male, nystagmus, 6 children.
  g male, nystagmus, 1 child.
III.
Children IIc.
  4 (?), normal.

Children IIf.

3 females, nystagmus.
3 males, normal.

Children IIg.

1 male, (?).

(Collateral heredity, 1 family; 7 children; 5 affected, 2 not. Direct heredity, 2 families; 2 fathers affected; 10 children; 3 affected, 7 not.)

VIII. Clarke. (68)

Family of 6 generations. The nystagmus was always inherited through the eldest daughter, but she and all the daughters remained free. All the male members had nystagmus, but did not transmit the condition.

(Not statistically available.)

IX. Fisher. (115)

Father and daughter congenital horizontal nystagmus.

(Direct heredity, 1 family; father and 1 child affected.)

X. Hawthorne. (171)

Grandfather and 3 grandchildren had horizontal nystagmus.

(Indirect heredity, 1 family; 3 children, all affected. Direct heredity, 1 family; father affected, 1 child not affected.)

XI. Kaufman. (210)

2 brothers, only, members of a large family, had nystagmus.

(Not statistically available.)

XII. Leber. (244)

6 children had nystagmus.

(Collateral heredity, 1 family; 6 children, all affected.)

XIII. Neuffer. (315)

(A) 2 children nystagmus and retinitis pigmentosa; 4 others normal.

(Collateral heredity, 1 family; 6 children; 2 affected, 4 not.)

(B) Brother and sister nystagmus and retinitis pigmentosa.

(Collateral heredity, 1 family; 2 children, both affected.)

XIV. Owen. (324)

Congenital nystagmus in 4 generations.

(Not statistically available.)

XV. Page. (325)

Granddaughter, mother, maternal aunt and grandmother had nystagmus and irideremia.

(Direct heredity, 2 families; 2 mothers affected; 3 children, all affected.)

XVI. Pisentie. (344)

2 sons and 1 daughter hydrocephalus, congenital cataract, and nystagmus; 1 daughter convergent strabismus; 2 daughters normal.

(Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

XVII. Polte. (345)

Mother and son nystagmus, etc.

(Direct heredity, 1 family; mother and 1 child affected.)

XVIII. Schmidt. (393)

(6) 3 brothers nystagmus and retinitis pigmentosa.

(Collateral heredity, 1 family; 3 children, all affected.)

XIX. (Sinclair. (411)

2 children congenital horizontal nystagmus; maternal aunt and 3 children same.

(Direct heredity, 1 family; mother and 3 children affected. Indirect heredity, 1 family; 2 children, both affected.)

XX. Thye. (451)

Father and son nystagmus, etc.

(Direct heredity, 1 family; father and 1 child affected.)

XXI. Wood. (486)

I. male, nystagmus, 11 children.
II. female, nystagmus, (?) children.
10 (?), normal, (?) children.
III. 4 (?), normal.
1 female, nystagmus.

(III generation is not statistically available. Direct heredity, 1 family; father affected; 11 children; 1 affected, 10 not.)

Ophthalmoplegia and Ptosis.

I. Beaumont. (29)

In 4 generations of a family, 5 males and 7 females suffered from ophthalmoplegia externa, which appeared in adult life.

(Not statistically available.)

II. Cohn. (70)

Found strabismus in 805 out of 27.000 patients—2.9%. Heredity was present as follows: parents 25%; grandparents 7%; brothers 26%; uncles 11%; aunts 12%.

III. Cutler. (78)

Parents were first cousins; they and 3 of their 6 children had strabismus.

(Direct heredity, 1 family; both parents affected; 6 children; 3 affected, 3 not.)

IV. Dujardin. (100)

Maternal grandfather, mother and 4 daughters had congenital ptosis; 1 daughter had, in addition, a partial external ophthalmoplegia.

(Direct heredity, 2 families; 1 father and 1 mother affected; 5 children, all affected.)

V. Frickenhaus. (122)

Father amaurosis right eye and strabismus; 2 children bilateral retinitis pigmentosa; 1 daughter strabismus and nystagmus.

(Not statistically available.)

VI. Gourzein. (149)

Grandfather, aunt, father and 5 sons had double congenital ophthalmoplegia externa; 3 daughters normal.

(Direct heredity, 2 families; 2 fathers affected; 10 children; 7 affected, 3 not.)

VII. Guende. (156)

3 brothers with congenital ophthalmoplegia externa.

(Collateral heredity, 1 family; 3 children, all affected.)

VIII. Günzburg. (160)

I. female, convergent strabismus, 1 child.
II. male, convergent strabismus, 5 children.
III. a (?), alternating divergent strabismus.
  b (?), convergent strabismus.
  c (?), paralysis abducent both eyes.
  2 (?), normal.

(Direct heredity, 2 families; 1 father and 1 mother affected; 6 children; 4 affected, 2 not.)

IX. Heard. (172)

I. male, ptosis and ophthalmoplegia ex., 4 children.
II. a male, ptosis and ophthalmoplegia ex., 2 children.
  b male, ptosis and ophthalmoplegia ex., no children.
  2 females, ptosis and ophthalmoplegia ex., no children.
III. 2 males, ptosis and ophthalmoplegia ext.

(Direct heredity, 2 families; 2 fathers affected; 6 children, all affected.)

X. Heuck. (177)

Mother and 3 children ptosis, bulbi converging, directed downwards: 1 child normal.

(Direct heredity; 1 family; mother affected; 4 children; 3 affected, 1 not.)

XI. Kunn. (227)

1 brother and 2 sisters paralysis of one or more ocular muscles.

(Collateral heredity, 1 family; 3 children, all affected.)

XII. Landesberg. (232)

Mother and 4 children strabismus.

(Direct heredity, 1 family; mother and 4 children affected.)

XIII. Lang and Barrett. (234)

29% convergent strabismus hereditary.

XIV. Lawford. (238)

Father and 3 of 7 children bilateral ptosis, complete absence of up and down movements and restricted lateral.

(Direct heredity, 1 family; father affected; 7 children; 3 affected, 4 not.)

XV. Motolese. (300)

Father and daughter congenital paralysis all external eye muscle.

(Direct heredity, 1 family; father and 1 child affected.)

XVI. Münden. (305)

Mother acquired ptosis; this was inherited for 3 generations.

(Not statistically available.)

XVII. Pagniez. (328)

7 members of a family in 3 generations had muscular affections of the eyes, gradually becoming better.

(Not statistically available.)

XVIII. Panas. (331)

Grandfather, father and 4 children greater or less degree of ophthalmoplegia; 2 daughters normal.

(Direct heredity, 2 families; 2 fathers affected; 7 children; 5 affected, 2 not.)

XIX. Pflüger. (341)

Father and son bilateral congenital ophthalmoplegia.

(Direct heredity, 1 family; father and 1 child affected.)

XX. Rampoldi. (363)

Father, son and daughter congenital, complete paralysis both eyes and upper lids.

(Direct heredity, 1 family; father and 2 children affected.)

XXI. Rampoldi. (364)

Bilateral congenital ptosis in father and daughter.

(Direct heredity, 1 family; father and 1 child affected.)

XXII. Ray. (366)

(1) 3 families, 2 or more members convergent strabismus.

(Not statistically available.)

(2) Mother and 2 daughters convergent strabismus.

(Direct heredity, 1 family; mother and 2 children affected.)

XXIII. Reber. (367)

3 children convergent strabismus, etc.

(Collateral heredity, 1 family; 3 children, all affected.)

XXIV. Sattler. (384)

Father and 4 sons congenital epicanthus and ptosis.

(Direct heredity, 1 family; father and 4 children affected.)

XXV. Schiler. (391)

Father and son cong. bilat. ptosis and ophthalmoplegia externa.

(Direct heredity, 1 family; father and 1 child affected.)

XXVI. Steinheim. (425)

I. male, epicanthus and ptosis, 5 children.
II. a male, epicanthus and ptosis, (?) children.
  b male, epicanthus and ptosis, 2 children.
  c female, epicanthus and ptosis, (?) children.
  2 (?), normal, no children.
III.
Children IIb.
  a female, normal, no children.
  b female, epicanthus and ptosis, 5 children.
IV. a male, epicanthus and ptosis, 4 children.
  b male, epicanthus and ptosis, 6 children.
  c female, epicanthus and ptosis, 3 children.
  2 (?), normal.
V.
Children IVa.
  2 (?), normal.
  2 (?), epicanthus and ptosis.
Children IVb.
  3 (?), epicanthus and ptosis.
  3 (?), normal.
Children IVc.
  2 (?), normal.
  1 (?), epicanthus and ptosis.

(Direct heredity, 6 families; 4 fathers and 2 mothers affected; 25 children; 13 affected, 12 not.)

XXVII. Vignes. (464)

I. male, ptosis, epicanthus, blepharophimosis, 11 children.
II. a male, ptosis, epicanthus, blepharophimosis, 5 children.
  b male, ptosis, epicanthus, blepharophimosis, 2 children.

c, d, e male, ptosis, epicanthus, blepharophimosis, no children.
f female, ptosis, epicanthus, blepharophimosis, no children.
g male, normal, 1 child.
4 females, normal, no children.

III.

Children IIa.
a, b males, ptosis, epicanthus, blepharophimosis.
c female, ptosis, epicanthus, blepharophimosis.
d, e (?), normal.

Children IIb.
f male, ptosis, epicanthus, blepharophimosis, 3 children.
g female, normal.

Children IIg.
h female, ptosis, epicanthus, blepharophimosis.

IV. 1 female, ptosis, epicanthus, blepharophimosis.
2 (?), normal.

(Direct heredity, 4 families; 4 fathers affected; 21 children; 11 affected, 10 not. Indirect heredity, 1 family, 1 child affected.)

XXVIII. Vossius. (466)

2 brothers paralysis all levators and depressors; 4 others normal.

(Collateral heredity, 1 family; 6 children; 2 affected, 4 not.)

XXIX. Zweig. (496)

Father and daughter congenital ptosis; 4 children normal.

(Direct heredity, 1 family; 5 children; 1 affected, 4 not. Father affected.)

RETINITIS PIGMENTOSA.

I. Abelsdorf. (2)

I. female, night blindness, 1 child.
II. female, night blindness, 3 children.
III. a female, retinitis pigmentosa, 3 children.
b female, retinitis pigmentosa, no children.
c male, normal, no children.
IV.
Children of IIIa.
a male, normal, no children.
b female, retinitis pigmentosa, no children.
c (?), too young to be examined.

(Direct heredity, 3 families; 3 mothers affected; 6 children; 4 affected, 2 not, 1 unknown—disregarded.)

II. Ancke. (10)

(A) In this family, the grandfathers were cousins. The father had slight pigmentation of one eye, while 3 of his 5 children had retinitis pigmentosa.

(Direct heredity, 1 family; father affected; 5 children; 3 affected, 2 not.)

(B) In this family, the grandmothers were sisters. 3 out of the 5 children had retinitis pigmentosa.

(Collateral heredity, 1 family; 5 children, 3 affected, 2 not.)

III. Atwool. (18)

I. male, congenital night blindness.
II. 1 male and 2 females night blindness, several others normal.
III.
Children of male.
1 male and two females night blindness.

(Only III generation and their parent can be used. Direct heredity, 1 family; father and three children affected.)

IV. Aubineau. (19)

3 children of normal parents, retinitis pigmentosa and nystagmus.

(Collateral heredity, 1 family; 3 children affected.)

V. Ayres. (21)

Reports 25 cases of retinitis pigmentosa in 19 families.

(A, B, C) 2 brothers and 1 sister retinitis pigmentosa; 2 children normal.

(Collateral heredity, 1 family; 5 children, 3 affected, 2 not.)

(D) Father retinitis pigmentosa, all children normal.

(Not statistically available, as number of children is not given.)

(E) Maternal grandmother night blindness, 2 granddaughters retinitis pigmentosa, 1 granddaughter vision diminished, cause not given.

(Indirect heredity, 1 family; 2 grand children affected, 1 unknown—disregarded. Direct heredity, 1 family; mother affected, 1 child not.)

(F) Mother and two daughters retinitis pigmentosa.

(Direct heredity, 1 family; mother affected; 2 children, both affected.)

(G) 2 brothers retinitis pigmentosa.

(Collateral heredity, 1 family, 2 children affected.)

(H) Patient has retinitis pigmentosa, 3 brothers and 1 sister defective sight, cause not given.

(Not statistically available.)

(I) 6 out of 10 children have retinitis pigmentosa.

(Collateral heredity, 1 family; 10 children, 6 affected, 4 not.)

The other cases have incomplete family histories.

VI. Bayer. (28)

(11) Aunt and niece have retinitis pigmentosa.

(Indirect heredity, 1 family; 1 child affected.)

(19) Mother and 3 out of 5 children have retinitis pigmentosa.

(Direct heredity, 1 family; mother affected; 5 children; 3 affected, 2 not.)

VII. Cant. (64)

Father was an epileptic; 4 children had retinitis pigmentosa.

(Collateral heredity, 1 family; 4 children; all retinitis pigmentosa.)

VIII. T. Collins. (71)

4 out of 12 children had retinitis pigmentosa.

(Collateral heredity, 1 family; 12 children; 4 affected, 8 not.)

IX. F. Cunier. (75)

This was most probably a case of hereditary retinitis pigmentosa. The family has been traced back to 1637. In 6 successive generations, there were 125 persons affected, the number in each generation gradually diminishing from 2/3 to 1/9.

(Not statistically available.)

X. Cutler. (77)

3 sisters with opacities of the lens, night blindness, atrophy of the chorioid, and thick network of black pigment at the periphery.; 4 brothers normal.

(Collateral heredity, 1 family; 7 children; 3 affected, 4 not.)

XI. Cutler. (78)

I. male, (?).
II. female, (?), 7 children.
III. a male, retinitis pigmentosa, died age 9 years.
b male, normal, died young.
c female, normal, died young.
d male, retinitis pigmentosa, all children normal.
e female, normal, 1 child.
f female, normal, 1 child.
g female, normal, 1 child.
IV.
Children of IIIe.
a male, retinitis pigmentosa, 3 children.

Children of IIIf.

b male, retinitis pigmentosa, 3 children.

Children IIIg.

c male, retinitis pigmentosa, 2 children.

V. All children normal.

(Direct heredity, 3 families; 3 fathers affected; 8 children, all normal. In addition, there is the family of IIId and his children, whose number is not given, therefore cannot be used statistically. Collateral heredity, 1 family; 7 children; 2 affected, 5 normal. Indirect heredity, uncle to nephews, 3 families; 3 children; all affected.)

XII. Cutler. (78)

3 children hemeralopia, 5 others normal.

(Collateral heredity, 1 family; 8 children; 3 affected, 5 not.)

XIII. Cutler. (78)

Patient has night blindness; 3 children normal.

(Direct heredity, 1 family; parent affected; 3 children, all normal.)

XIV. Daguillon. (80)

Grandfather, father and 2 sons retinitis pigmentosa.

(Direct heredity, 2 families; 2 fathers affected; 3 children, all affected.)

XV. Darier. (82)

6 cases of retinitis pigmentosa in one family.

(Not statistically available.)

XVI. Davidson. (84)

(A) 2 out of 6 children retinitis pigmentosa.
(B) 1 out of 5 children retinitis pigmentosa.
(C) 3 out of 6 children retinitis pigmentosa.
(D) 2 out of 5 children retinitis pigmentosa.

(Collateral heredity; 4 families; 22 children; 9 affected, 13 not.)

XVII. Denti. (88)

Father retinitis pigmentosa bilateralis. A son 3 years old and a daughter 5 years old had hemeralopia and pigmentary degeneration of the retina.

(Direct heredity, 1 family; father affected; 2 children, both affected.)

XVIII. Derig. (90)

(A) 2 out of 6 brothers had retinitis pigmentosa.

(Collateral heredity, 1 family; 6 children; 2 affected, 4 not.)

(B) 2 brothers and 2 sisters retinitis pigmentosa.

(Collateral heredity, 1 family; 4 children, all affected.)

(C, D, E) 2 brothers and 1 sister retinitis pigmentosa.

(Collateral heredity, 1 family; 3 children, all affected.)

(F, G) Brother and sister retinitis pigmentosa.

(Collateral heredity, 1 family; 2 children, both affected.)

(H) Brother and sister retinitis pigmentosa.

(Collateral heredity, 1 family; 2 children, both affected.)

The author reports, in all, 27 cases from the Bonn clinic. The others are not statistically available.

XIX. Donders. (96)

Father hemeralopia, son retinitis pigmentosa.

(Direct heredity, 1 family; father affected; 1 child, affected.)

XX. Donders. (97)

Father and 3 sons congenital night blindness.

(Direct heredity, 1 family; father affected; 3 children, all affected.)

XXI. Dujardin. (101)

Twin brothers had retinitis pigmentosa.

(Collateral heredity, 1 family; 2 children, both affected.)

XXII. Förster. (118)

2 brothers hemeralopes.

(Collateral heredity, 1 family; 2 children, both affected.)

XXIII. Franklin. (120)

I. (?), normal, 3 children.
II. a female, retinitis pigmentosa, no children.
  b male, normal, no children.
  c female, retinitis pigmentosa, 7 children.
III. a female, normal, 1 child.
  b female, normal, 1 child.
  c male, retinitis pigmentosa, no children.
  d male, retinitis pigmentosa, 5 children.
  e male, retinitis pigmentosa, 2 children.
  f male, normal, no children.
  g female, retinitis pigmentosa, 6 children.
IV.
Children of IIIa, IIIb, IIId.
  all normal.
Children of IIIe.
  male, retinitis pigmentosa.
  (?), normal.
Children IIIg.
  2 males, retinitis pigmentosa.
  1 male and 3 females normal.

(Collateral heredity, 1 family; 3 children; 2 affected, 1 not. Direct heredity, 4 families; 2 mothers and 2 fathers affected; 20 children; 7 affected, 13 not.)

XXIV. Frickenhaus. (122)

Father amaurosis right eye, 2 children retinitis pigmentosa, 1 daughter strabismus and nystagmus.

(Collateral heredity, 1 family; 3 children; 2 affected, 1 not.)

XXV. Frorieps. (127)

Both parents and 4 of 7 children were night blind.

(Direct heredity, 1 family; both parents affected; 7 children; 4 affected, 3 not.)

XXVI. Gonin. (146)

(11)

I. male, retinitis pigmentosa, 2 children.
II. a female, normal, 1 child.
b female, normal, 10 children.
III.
Children IIa.
a (?), normal.
b, c, d males, retinitis pigmentosa.
e, f, g, h, i, j, k females, all normal.

(Direct heredity, 1 family; father affected; 2 children, both normal. Indirect heredity, 1 family; 10 children; 3 affected, 7 not.)

XXVII. Gould. (147)

I. male, night blindness, 1 child.
II. male, normal, 4 children.
III. a male, retinitis pigmentosa sine pigmento.
b female, retinitis pigmentosa sine pigmento.
b female, retinitis pigmentosa sine pigmento.
c, d male and female, normal.

(Direct heredity, 1 family, father affected; 1 child not affected. Indirect heredity; 1 family; 4 children; 2 affected, 2 not.)

XXVIII. Groenouw. (155)

In 3% of all cases, retinitis pigmentosa is directly hereditary; in 20%, there is collateral heredity. About 25% of cases are children of consanguineous parents.

(A)

I. female, died blind.
II. female, hemeralopia.
III. several children near-sighted; 1 female hemeralopia.
IV. male, retinitis pigmentosa.
female, acute retrobulbar neuritis.

(Not statistically available.)

XXIX. Herrlinger. (175)

Retinitis pigmentosa may exist alone or may be accompanied by some malformation or disease of the eye or some other part of the body. Inheritance may be similar, when the same condition is inherited, or dissimilar, when a related condition is inherited. In 92 cases of retinitis pigmentosa, there were the following cases of heredity:

(1, 2) 2 brothers, retinitis pigmentosa.

(5, 54) Brother and sister affected; 1 other sister affected.

(7) Patient and 1 sister affected.

(8) Patient and 1 sister affected.

(9) Patient, 1 brother and one sister affected; 7 other children normal.

(18) Patient, 2 other children and grandaunt affected; 2 children normal.

(20) Patient retinitis pigmentosa, father night shadows.

(21) 2 children affected.

(22, 23) Brother and sister affected.

(25) 3 children affected.

(26) Patient retinitis pigmentosa, mother night shadows.

(29) 2 children affected.

(30) 2 children affected.

(36) 2 children, grandfather and his brother affected.

(38) Patient, brother, mother and two maternal aunts affected.

(39) 2 children affected.

(40) Patient and 2 maternal aunts affected.

(42, 43) Brother and 2 sisters affected.

(45) 2 children, their grandfather and another grandson affected.

(47) 3 children affected.

(57, 58) 3 children affected.

(59, 60) 5 children affected.

(61) Father and son affected.

(62, 63) Brother and sister affected.

(64) 2 children affected.

(68, 69, 70) 4 children affected.

(78) 2 children and paternal uncle affected.

(84) Mother and 2 children affected.

(86) 2 children, mother and maternal uncle affected.

(87, 88) 2 sisters affected.

(Several other cases where the proof of the retinitis pigmentosa seemed insufficient are quoted in the chapter on general diseases of the eye. There are above, direct heredity, 9 families; 5 fathers and 4 mothers affected; 12 children; 9 affected, 3 not. Indirect heredity, 6 families; 12 children; 10 affected, 2 not. Collateral heredity, 23 families; 64 children; 57 affected, 7 not.)

XXX. Hocquard. (186)

I. (?), normal, 2 children.
II. a male, normal, 2 children.
b male, retinitis pigmentosa, no children.
III. a male, retinitis pigmentosa, 1 child.
b male, retinitis pigmentosa, no children.
IV. male, retinitis pigmentosa, no children.

(Indirect heredity, 1 family; 2 children; both affected. Direct heredity 1 family; father and 1 child affected.)

XXXI. Hutchinson. (196)

Retinitis pigmentosa is undoubtedly hereditary.

XXXII. Hutchinson. (197)

In a certain family, blindness had been hereditary for centuries, 2 members affected with retinitis pigmentosa at the time of writing. (v. also Nettleship.)

(Not statistically available.)

XXXIII. Jacobsohn. (201)

Father and son retinitis pigmentosa; 3 other children died young.

(Direct heredity, 1 family; father affected; 4 children; 1 affected, 3 not.)

XXXIV. Kaupp. (212)

(A) Father and 1 brother retinitis pigmentosa; 2 sisters normal; 3 children normal.

(B) Father retinitis pigmentosa; 2 children normal.

(C) Mother retinitis pigmentosa; 2 children normal.

(D) Mother retinitis pigmentosa; 6 children normal.

(E) 2 brothers retinitis pigmentosa.

(Collateral heredity, 2 families; 6 children; 4 affected; 2 not. Direct heredity, 4 families; 2 mothers and 2 fathers affected; 13 children, all normal.)

XXXV. La Gleyze. (230)

Healthy uncle and niece married; 2 sons retinitis pigmentosa; 2 first cousins of the father also diseased (case 28).

(Collateral heredity, 2 families; 4 children, all affected.)

XXXVI. Lawford. (239)

Numerous consanguineous marriages of ancestors. Parents are uncle and niece; 3 sons and 2 daughters retinitis pigmentosa; 6 children normal.

(Collateral heredity, 1 family; 11 children; 5 affected, 6 not.)

XXXVII. Leber. (243)

Says v. Graefe told him of several families where he had found a part or all of the children affected with retinitis pigmentosa. He, himself, had seen many such cases.

XXXVIII. Leber. (244)

(A) Maternal great-grandmother, grandmother, mother, uncle and aunt and 2 children retinitis pigmentosa; 1 child normal.

(Direct heredity, 3 families; 3 mothers affected; 7 children; 6 affected, 1 not.)

(B) 3 children retinitis pigmentosa, 3 normal.

(Collateral heredity, 1 family; 6 children; 3 affected, 3 not.)

(C) 2 children retinitis pigmentosa, other children normal.

(Not statistically available.)

(D) 4 children out of 6 had retinitis pigmentosa.

(Collateral heredity, 1 family; 6 children; 4 affected, 2 not.)

XXXIX. Leber. (247)

Quotes several cases of hereditary night blindness. It may be either congenital or acquired. In 40 cases, he found 28 with a hereditary history. In one case, he found direct heredity. Collateral heredity was present 14 times=31.8%. He reports the following case:

1 sister and 2 brothers retinitis pigmentosa.

(Collateral heredity, 1 family; 3 children, all affected.)

XL. Lee. (248)

(A) Grandfather, mother and son retinitis pigmentosa; 1 son not.

(Direct heredity, 2 families; 1 father and 1 mother affected; 3 children; 2 affected, 1 not.)

(B) 2 brothers married 2 sisters, who were their first cousins. First family: 1 son and 2 daughters retinitis pigmentosa, 1 daughter normal. Second family: 2 sons retinitis pigmentosa, 1 daughter normal.

(Collateral heredity, 2 families; 7 children; 5 affected, 2 not.)

XLI. Liebreich. (252)

3 out of 13 children of normal parents had retinitis pigmentosa.

(Collateral heredity, 1 family; 13 children; 3 affected, 10 not.)

XLII. Maes. (270)

3 brothers night blindness.

(Collateral heredity, 1 family; 3 children, all affected.)

XLIII. Maes. (271)

I. (?), normal, 6 children.
II. a male, retinitis pigmentosa, no children.
b male, retinitis pigmentosa, no children.
c, d, e male, normal, no children.
f female, normal, no children.
III. a male, retinitis pigmentosa, no children.
c female, normal, no children.

(Direct heredity, 1 family; father affected; 3 children; 2 affected, 1 not. Collateral heredity, 1 family; 6 children; 2 affected, 4 not.)

(B) 3 sisters out of 11 children had retinitis pigmentosa.

(Collateral heredity, 1 family; 11 children; 3 affected, 8 not.)

XLIV. Magnus. (274)

(10) Father retinitis pigmentosa, 1 child normal.

(11) Mother retinitis pigmentosa, 1 child normal.

(12) Mother retinitis pigmentosa, 1 child normal, 3 affected.

(Direct heredity, 3 families; 1 father and 2 mothers affected; 6 children; 3 affected, 3 not.)

XLV. Mooren. (297)

2 brothers and 1 sister retinitis pigmentosa.

(Collateral heredity, 1 family; 3 children, all affected.)

XLVI. Mooren. (298)

(A) Mother retinitis pigmentosa, 2 children hemeralopia.

(Direct heredity, 1 family; mother and 2 children affected.)

(B)

I. (?), normal, first cousins, 6 children.

II. a male, normal, 4 children.
  b male, retinitis pigmentosa, married his first cousin, 4 children.
  c, d, e, f (?), normal, no children.

III.

Children IIa.
  a, b males, retinitis pigmentosa.
  c, d males, normal.

Children IIb.
  e, f, g, h (?), retinitis pigmentosa.

(Direct heredity, 1 family; father and 4 children affected. Indirect heredity, 1 family; 4 children; 2 affected, 2 not.)

XLVII. Nettleship. (309)

Pigment spots and irregularities of pigment at the equator of the eye, with simultaneous night blindness in 4 members of 2 families.

(Not statistically available.)

XLVIII. Nettleship. (313)

1800 persons in 10 generations of one family affected with retinitis pigmentosa, but only in certain branches, always passing from parent to child without a break, rather more prevelant in the females than the males.

(Not statistically available.)

XLIX. Nettleship. (314)

Finds heredity without consanguinity in 23.5% of cases; consanguinity without heredity in 23%; and both together in 3-4%.

(1)

I. female, retinitis pigmentosa, 3 children.
II. a female, retinitis pigmentosa, 8 children.
b female, normal, 1 child.
c male, normal, 9 children.

III.

Children IIa.

a male, retinitis pigmentosa, 4 children.
b female, normal, 8 children.
c female, normal, 3 children.
d female, retinitis pigmentosa, 1 child.
e female, retinitis pigmentosa, 6 children.
f male, normal, no children.
g female, retinitis pigmentosa, 7 children.
h female, normal, 1 child.

Children IIb.

i (?), normal, 1 child.

Children IIc.

j male, normal, 1 child.
k female, normal, 1 child.
l male, normal, 7 children.
6 others (?), normal, no children.

IV.

Children IIIa.

a male, retinitis pigmentosa, 3 children.
b female, retinitis pigmentosa, 7 children.
c female, retinitis pigmentosa, 6 children, married IVe.
d male, normal, 9 children.

Children IIIb.

e male, normal, 6 children, married IVc.
f, g, h male, normal, no children.
i female, normal, no children.
j female, normal, 11 children.
k female, normal, 7 children.
l female, normal, 5 children.

Children IIIc.

m male, normal, no children.
n male, normal, 4 children.
o female, normal, no children.

Children IIId.

p female, normal, 2 children.

Children IIIe.

q male, retinitis pigmentosa, no children.
r female, normal, 3 children.
s female, normal, 7 children.
t, u 2 females, normal, no children.
v female, retinitis pigmentosa, 2 children.

Children IIIg.

w 3 children, normal, no children.
x male, retinitis pigmentosa, 5 children.
y 2 males, normal no children.
z male, normal, married first cousin once removed Vm, 4 children.

Children IIIh.

aa female, normal, 3 children.

Children IIIi.

ab (?), normal, no children.

Children IIIj.

ac male, normal, 1 child.

Children IIIk.

ad male, normal, 7 children.

Children IIIl.

7 children, normal, no children.

V.

Children IVa.

a female, retinitis pigmentosa, 12 children.
b female, normal, 11 children.
c female, normal, 8 children.

Children IVb.
- d male, retinitis pigmentosa, 4 children.
- e female, normal, 5 children.
- f male, retinitis pigmentosa, no children.
- g female, normal, 8 children.
- h female, retinitis pigmentosa, 9 children.
- i male, retinitis pigmentosa, 1 child.
- j male, retinitis pigmentosa, no children.

Children IVc and IVe.
- k male, normal, no children.
- l male. normal, 4 children.
- m female, retinitis pigmentosa, married twice, first husband was IVz, 6 children.
- n male, retinitis pigmentosa, 5 children.
- o female, normal, 4 children.
- p male, retinitis pigmentosa, 3 children.

Children IVd.
- 9 children, normal, no children.

Children IVj.
- 11 children, normal, no children.

Children IVk, IVl, IVn, IVp, IVr, IVs.
- 28 children, normal, no children.

Children IVv.
- q female, retinitis pigmentosa, 3 children.
- r female, retinitis pigmentosa, 1 child.

Children IVx.
- s, t males, retinitis pigmentosa, no children.
- u, v, w males, normal, no children.

Children IVz—see Vm.

Children IVaa.
- 1 male, normal, no children.
- 2 females, normal, no children.

Children IVac.
- 1 (?), normal, no children.

Children IVad.
- x 7 in all, normal, no children.

VI.

Children Va.
- 3 males, retinitis pigmentosa.
- 1 female, retinitis pigmentosa.
- 4 males, normal.
- 1 female, normal.
- 3 (?), normal.

Children Vb, Vc, Vd, Ve, Vg.
- 36 children, normal.

Children Vh.
- 1 male, retinitis pigmentosa.
- 8 children, normal.

Children Vi.
- 1 male, retinitis pigmentosa.

Children Vl.
- 4 children, normal.

Children Vm.
- by first husband, who was IVz.
  - a female, retinitis pigmentosa, 3 children.
  - b male, retinitis pigmentosa.
  - c, d male, normal.
- by second husband.
  - e male, retinitis pigmentosa.
  - 2 children, normal.

Children Vn.
- 1 female, retinitis pigmentosa.
- 1 female, normal.
- 3 males, normal.

Children Vo.
- 4 children, normal.

Children Vp.
- 2 females, retinitis pigmentosa.
- 1 female, normal.

Children Vq.
- 1 female, retinitis pigmentosa.
- 2 males, normal.

Children Vr.
- 1 male, normal.

Children Vx.
- 7 children, normal.

VII.

Children VIa.
- 3 children, normal.

(Direct heredity, 21 families; 14 mothers and 7 fathers affected; 99 children; 36 affected, 63 normal.)

(6)
I. female, retinitis pigmentosa, 1 child.
II. female, retinitis pigmentosa, 2 children.
III. a female, retinitis pigmentosa, no children.
b male, retinitis pigmentosa, 10 children.
IV. 5 children, normal.
1 (idiot), normal.
4 children died in infancy (not counted).

(Direct heredity, 3 families; 2 mothers and 1 father affected; 9 children; 3 affected, 6 not, 4 unknown—not counted.)

(12)
I. (?), normal, 3 children.
II. a female, retinitis pigmentosa, no children.
b male, retinitis pigmentosa, no children.
c female, retinitis pigmentosa, 8 children.
III. 4 female, retinitis pigmentosa.
1 male, retinitis pigmentosa.
3 male, normal.

(Direct heredity, 1 family; mother affected; 8 children; 5 affected, 3 not. Collateral heredity, 1 family; 3 children, all affected.)

(14)
I. (?), normal, 3 children.
II. a, b (?), normal, no children.
c female, retinitis pigmentosa, 2 children.
III. a male, normal, no children
b female, retinitis pigmentosa, 1 child.
IV. female, not affected.

(Direct heredity, 2 families; 2 mothers affected; 3 children; 1 affected, 2 not.)

(15b)

Maternal great-uncle retinitis pigmentosa; 4 brothers and 3 sisters affected. 1 brother not.

(Indirect heredity, 1 family; 8 children; 7 affected, 1 not.)

(17)

Grandfather and granddaughter retinitis pigmentosa.

(Indirect heredity, 1 family; 1 child affected. Direct heredity, 1 family; father affected, child not affected.)

(20)

I. male, normal, 5 children.

II. a male, normal, 10 children.
b male, normal, 13 children.
c male, normal, 2 children.
d male, normal, no children.
e female, normal, no children.

III.

Children IIa.
2 males, retinitis pigmentosa.
1 female, retinitis pigmentosa.
7 (?), normal.

Children IIb.
6 males, retinitis pigmentosa.
7 (?), normal.

Children IIc.
2 (?), normal.

(Collateral heredity, 2 families; 23 children; 8 affected, 15 not.)

(27) 2 out of 4 brothers retinitis pigmentosa.

(28) 2 brothers and 1 sister retinitis pigmentosa; 17 children normal.

(Collateral heredity, 2 families; 24 children; 5 affected, 19 not.)

(28a)

I. female, retinitis pigmentosa, 1 child.

II. female, retinitis pigmentosa, 3 children.

III. a female, retinitis pigmentosa.
b male, retinitis pigmentosa.
c male, normal.

(Direct heredity, 2 families; 2 mothers affected; 4 children; 3 affected, 1 not.)

(32) first 4 generations normal.

V. a male, retinitis pigmentosa, 2 children.
b male, retinitis pigmentosa, no children.
3 (?), normal, no children.

VI. 2 (?), normal.

(Direct heredity, 1 family; father affected; 2 children, both normal. Collateral heredity, 1 family; 5 children; 2 affected, 3 not.)

(60) Parents (uncle and niece), normal; 1 son and 1 daughter retinitis pigmentosa; 4 sons and 1 daughter normal.

(64) Parents (first cousins), normal; 2 sons and 2 daughters retinitis pigmentosa; 2 normal; 2 too young to be tested (not counted).

(67) 2 brothers out of 6 children retinitis pigmentosa.

(65) 2 out of 4 sisters retinitis pigmentosa.

(Collateral heredity, 4 families; 23 children; 10 affected, 13 not.)

L. Neuffer. (315)

(5) 2 brothers and 1 sister retinitis pigmentosa.

(Collateral heredity, 1 family; 3 children, all affected.)

(12) 2 sisters retinitis pigmentosa; 1 brother choric-retinitis.

(Collateral heredity, 1 family; 3 children; 2 affected, 1 doubtful—classed as not affected.)

(13) 2 sisters retinitis pigmentosa.

(Collateral heredity, 1 family; 2 sisters affected.)

(15) 1 brother retinitis pigmentosa; 5 other children poor vision.

(Not statistically available.)

(17) 2 children retinitis pigmentosa and nystagmus; 4 children normal.

(Collateral heredity, 1 family; 6 children; 2 affected, 4 not.)

(19) 2 sisters retinitis pigmentosa.

(24) 2 brothers retinitis pigmentosa.

(25) Brother and sister retinitis pigmentosa.

(Collateral heredity, 3 families; 6 children; all affected.)

Series II.

(1) Brother and sister retinitis pigmentosa and nystagmus.

(2) Brother and sister retinitis pigmentosa; 1 sister normal.

(3) 2 children retinitis pigmentosa; 3 other normal.

(4) 2 children retinitis pigmentosa; 6 others normal.

(5) 2 children retinitis pigmentosa.

(8) 2 children retinitis pigmentosa.

(Collateral heredity, 6 families; 22 children; 12 affected; 10 not.)

(6) Patient and maternal uncle retinitis pigmentosa.

(Indirect heredity, 1 family; 1 child affected.)

(7) Patient retinitis pigmentosa; 1 sister same; 1 daughter cataract and nystagmus; 5 children normal.

(Collateral heredity, 1 family; 2 children, both affected. Direct heredity, 1 family; 6 children, all unaffected; mother affected.)

LI. Nolden. (318)

(1) Mother and 4 out of 5 children retinitis pigmentosa.

(5) Mother and 7 out of 8 children retinitis pigmentosa.

(Direct heredity, 2 families; 2 mothers affected; 13 children; 11 affected, 2 not.)

LII. Oakley. (322)

(1) I. male, retinitis pigmentosa, 2 children.
  II. a male, retinitis pigmentosa, 2 children.
    b female, retinitis pigmentosa, 6 children.
  III.
  Children IIa.
    a male, retinitis pigmentosa, 2 children.
    b male, retinitis pigmentosa, no children.
  Children IIb.
    c male, retinitis pigmentosa, no children.
    5 (?), normal, no children.
  IV.
  Children IIIa.
    a male, retinitis pigmentosa.
    b female, normal.

(Direct heredity, 4 families; 3 fathers and 1 mother affected; 12 children; 6 affected, 6 not.)

(2) I. (?), normal.
  II. female, normal; married second cousin with retinitis pigmentosa, 2 children.
  III. a female, retinitis pigmentosa; married first cousin with ritinitis pigmentosa, 3 children.
    b female, normal; married normal first cousin, 5 children.

IV.

Children IIIa.

1 female, retinitis pigmentosa.

2 (?), normal.

Children IIIb.

5 (?), normal.

(Direct heredity, 1 family; father affected; 2 children; 1 affected, 1 not.)

(Direct heredity, 1 family; both parents affected; 3 children; 1 affected, 2 not.)

LIII. Pagenstecher. (326)

I. male, hemeralopia, 3 children.

II. a male, normal, 2 children.

b female, normal, 4 children.

c female, normal, 2 children.

III.

Children IIa.

a, b males, hemeralopia, no children.

Children IIb.

c male, hemeralopia, 1 child.

d male, hemeralopia, 2 children.

e male, normal, 1 child.

f female, no children.

Children IIc.

g, h males, hemeralopia, no children.

IV

Children IIIc.

a female, normal, 3 children.

Children IIId.

b, c females, normal, no children.

Children IIIe.

d male, normal, no children.

V.

Children IVa.

2 males, normal.

1 male, hemeralopia.

(Indirect heredity, 2 families; 11 children; 7 affected, 4 not. Direct heredity, 3 families; 3 fathers affected; 6 children, all normal.)

LIV. Panas. (330)

2 brothers with retinitis pigmentosa.

(Collateral heredity, 1 family; 2 children; both affected.)

LV. Poncet. (346)

Patient, father, uncle and great-uncle had retinitis pigmentosa.

(Direct heredity, 1 family; father and 1 child affected. Indirect heredity, 1 family; 2 children, both affected.)

LVI. Pufahl. (350)

2 children out of 4 retinitis pigmentosa.

(Collateral heredity, 1 family; 4 children; 2 affected, 2 not.)

LVII. Quaglino. (354)

Concludes from study of 15 cases that retinitis pigmentosa can be inherited, congenital or acquired.

LVIII. Rampoldi. (359)

4 brothers, sons of related parents, had retinitis pigmentosa.

(Collateral heredity, 1 family; 4 children, all affected.)

LIX. Ransohoff. (365)

I. (?), normal, 2 children.
II. a female, retinitis pigmentosa, 7 children.
b female, night blindness, 5 children.
Children IIa.
4 (?), retinitis pigmentosa.
2 (?), normal.
1 (?), unknown.
Children IIb.
2 (?), eye trouble.
3 (?), normal.

(Collateral heredity, 1 family; 2 children, both affected. Direct heredity, 1 family; mother affected; 6 children; 4 affected, 2 not. 1 more, condition unknown, not counted. Family IIb not statistically available.)

LX. Reinecke. (368)

Reports 94 cases of retinitis pigmentosa, of which 11 were certainly hereditary=11.7% ; 3 more doubtful.

(1) Maternal grandfather, mother, 3 out of 4 children, retinitis pigmentosa.

(2) Grandmother, mother, maternal uncle and son affected.

(Direct heredity, 4 families; 1 father and 3 mothers affected; 8 children; 7 affected, 1 not.)

(3) 18 cases of collateral heredity.
(Not statistically available.)

LXI. Rodsewitsch. (373)

Patient retinitis pigmentosa sine pigmento; mother blind; 1 sister and 1 brother sight less than normal.
(Not statistically available.)

LXII. Rosenbaum. (376)

(13) I. male, retinitis pigmentosa, 2 children.
II. a male, retinitis pigmentosa, no children.
b female, retinitis pigmentosa, 4 children.
III. 3 (?), retinitis pigmentosa.
1 normal.

(8, 9) 2 brothers retinitis pigmentosa.

(Direct heredity, 2 families; 1 father and 1 mother affected; 6 children; 5 affected, 1 not. Collateral heredity, 1 family; 2 children, both affected.)

LXIII. Roy. (378)

Grandmother, father, 3 children, night blindness; 4 brothers and 1 sister normal.

(Direct heredity, 2 families; 1 father and 1 mother affected; 9 children; 4 affected, 5 not.)

LXIV. Schmidt. (393)

"The most important cause of retinitis pigmentosa is heredity. It is a very frequent occurrence in all congenital eye diseases, and experimental pathology confirms this."

(1) Patient retinitis pigmentosa sine pigmento; mother, 1 sister and 1 brother poor vision.

(Not statistically available.)

(2) 3 brothers and sisters retinitis pigmentosa.

(3) Father, 3 children, and child of a fourth, himself not affected, had retinitis pigmentosa.

(4) 9 brothers and sisters retinitis pigmentosa.

(5) Brother and sister retinitis pigmentosa.

(Collateral heredity, 3 families; 14 children, all affected. Direct heredity, 1 family; father affected; 4 children; 3 affected, 1 not. Indirect heredity, 1 family; 1 child affected.)

(6) 3 brothers nystagmus and retinitis pigmentosa; 3 paternal cousins and 3 maternal cousins were blind.

(Collateral heredity, 1 family; 3 children affected. The remainder of the family history not statistically available.)

(7) Brother and sister retinitis pigmentosa.

(8) Twin brothers retinitis pigmentosa.

(9) Brother and sister retinitis pigmentosa.

(10) 2 brothers retinitis pigmentosa; 6 other brothers and sisters normal.

(11) 2 brothers retinitis pigmentosa and cataract.

(12) Brother and sister retinitis pigmentosa; 3 other children normal.

(13) 2 brothers retinitis pigmentosa.

(Collateral heredity, 7 families; 23 children; 14 affected, 9 not.)

The remaining cases are not statistically available. The author gives a very extensive literature. Out of 294 cases of retinitis pigmentosa which he has been able to collect, 78 showed collateral heredity=26.7%; 12 showed direct=4.1%.

LXV. Schneider. (399)

I. female, retinitis pigmentosa, 3 children.
II. a female, retinitis pigmentosa, 5 children.
b male, retinitis pigmentosa, no children.
c male, retinitis pigmentosa, no children.

III. a female, normal, 2 children.
  b male, normal, no children.
  c female, retinitis pigmentosa, 3 children.
  d male, normal, no children.
  e female, retinitis pigmentosa, no children.
IV.
Children IIIa.
  2 (?), normal.
Children IIIc.
  2 males, retinitis pigmentosa.
  1 female, normal.

(Direct heredity, 3 families; 3 mothers affected; 11 children; 7 affected, 4 not.)

LXVI. Seggel. (406)

I. male, retinitis pigmentosa, 1 child.
II. female, normal, 3 children.
III. a female, normal, 1 child.
  b, c male, retinitis pigmentosa, no children.
IV. a male, retinitis pigmentosa.

(Indirect heredity, 2 families; 4 children; 3 affected, 1 not. Direct heredity, 1 family; father affected, 1 child not.)

LXVII. Siegheim. (409)

Brothers and sisters may be affected with retinitis pigmentosa in several ways.

(1) All children can have disease, in which case the disease is more advanced in the older.

(2) One child may have unilateral and another bilateral disease.

(3) A part may be affected and the rest not.

(4) They may have different forms of the same disease.

(5) The children may each be affected by different eye diseases.

(6) They may, one or all, have other diseases, such as deaf-mutism, idiocy, etc., as well as the eye disease.

(7) They may have normal eyes and only the diseases mentioned in (6).

(8) The children may be born alternately affected and normal.

(9) The tendency of the children is either to die in infancy or to survive with retinitis pigmentosa.

Reports the following cases:

(1-12) 2 children in each family affected.

(Collateral heredity, 12 families; 24 children, all affected.)

(13) Patient retinitis pigmentosa and posterior polar cataract; same condition in family of father; mother and sisters likewise hemeralopes.

(Not statistically available.)

(15) Patient retinitis pigmentosa: 1 brother hemeralope; 2 brothers and 1 sister normal; materal uncle, grandfather and great-grandfather blind, 2 maternal aunts and 1 maternal uncle normal.

(Not statistically available.)

(17) 2 children and paternal great-uncle retinitis pigmentosa.

(Indirect heredity, 1 family; 2 children affected.)

(18) 2 children retinitis pigmentosa; same disease in mother's family.

(Not statistically available.)

(19) 4 children retinitis pigmentosa.

(20) 3 children retinitis pigmentosa.

(21) 2 children retinitis pigmentosa.

(22) 2 children retinitis pigmentosa.

(Collateral heredity, 4 families; 11 children, all affected.)

(27) Patient retinitis pigmentosa; other children blind or idiots..

(28) Patient retinitis pigmentosa; mother and another child poor vision.

(33) Patient retinitis pigmentosa; 1 sister blind.

(37) Patient retinitis pigmentosa; 1 sister blind.

(39) Patient retinitis pigmentosa; 4 other children more or less blind.

(The above are not statistically available.)

(35) Patient and one brother retinitis pigmentosa.

(36) Patient and 2 brothers retinitis pigmentosa.

(Collateral heredity, 2 families; 5 children, all affected.)

LXVIII. Smith. (413)

2 brothers and 2 sisters retinitis pigmentosa; 1 brother and 2 sisters normal.

(Collateral heredity, 1 family; 7 children; 4 affected, 3 not.)

LXIX. Snell. (415)

6 sons retinitis pigmentosa; 1 daughter normal; 1 son possibly prepigmentary stage.

(Collateral heredity, 1 family; 8 children; 6 affected, 2 not.)

LXX. Snell. (417)

I. male, retinitis pigmentosa, 2 children.
II. a female, retinitis pigmentosa, 6 children.
b female, normal, no children.
III.
Children IIa.
a male, retinitis pigmentosa, 11 children.
b female, retinitis pigmentosa, 4 children.
c males, retinitis pigmentosa, 1 child.
d males, normal, 1 child.
e female, normal, 3 children.
f male, retinitis pigmentosa, no children.
IV.
Children IIIa.
a male, normal, 4 children.
b female, retinitis pigmentosa, 3 children.
c female, retinitis pigmentosa, 1 child.
d female, normal, 4 children.
e male, retinitis pigmentosa, 11 children.
f, g females, retinitis pigmentosa, no children.
h females, normal, 6 children.
i male, normal, no children.
j female, normal, 3 children.
k female, normal, no children.
Children IIIb.
l female, retinitis pigmentosa, 3 children.
m female, retinitis pigmentosa, no children.
n male, retinitis pigmentosa, 4 children.
o male, normal, no children.

Children IIIc.
- p female, retinitis pigmentosa, no children.

Children IIId.
- q male, normal, no children.

Children IIIe.
- r male, normal, no children.
- s male, normal, 1 child.
- t male, normal, 3 children.

V.

Children IVa.
- 4 (?), normal.

Children IVb.
- 1 female, retinitis pigmentosa.
- 2 (?), normal.

Children IVc and IVd.
- 5 (?), normal.

Children IVe.
- 2 females, retinitis pigmentosa.
- 6 males, retinitis pigmentosa.
- 3 (?), normal.

Children IVh and IVj.
- 9 (?), normal.

Children IVl.
- 1 male, retinitis pigmentosa.
- 2 females, retinitis pigmentosa.

Children IVn.
- 2 females, retinitis pigmentosa.
- 2 males, normal.

Children IVs and IVt.
- 4 (?), normal.

(Direct heredity, 10 families; 5 fathers and 5 mothers affected; 46 children; 28 affected, 18 not.)

LXXI. Snell. (418)

Grandmother nyctalopia; 9 males and 3 females descendants out of 64 affected.

(Not statistically available.)

LXXII. Stievenart. (428)

Night blindness inherited through 4 generations.

LXXIII. Thier. (446)

3 children with congenital night blindness; 1 child normal.

(Collateral heredity; 1 family; 4 children; 3 affected, 1 not.)

LXXIV. Tobin. (453)

3 males and 1 female retinitis pigmentosa; 7 children normal.

(Collateral heredity, 1 family; 11 children; 4 affected, 7 not.)

LXXV. Trousseau. (456)

11 cases of retinitis pigmentosa; 5 showed heredity; 2 showed consanguinity.

(Not statistically available.)

LXXVI. Trousseau. (457)

A woman with retinitis pigmentosa married her uncle; their child had retinitis pigmentosa.

(Direct heredity, 1 family; mother and 1 child affected.)

LXXVII. Webster. (470)

(A) I. (?), (?), 3 children.
II. a male, normal, 1 child.
b female, normal, 2 children.
c female, retinitis pigmentosa, 4 children.
III.
Children IIa.
a (?), retinitis pigmentosa.
Children IIb.
b, c (?), retinitis pigmentosa.
Children IIc.
1 male, retinitis pigmentosa.
3 females, retinitis pigmentosa.

(Direct heredity, 1 family; mother and 4 children affected. Indirect heredity, 2 families; 3 children, all affected.)

(B) I. (?), normal, 2 children.
  II. a male, normal, 6 children.
    b. male, normal, married first cousin, 9 children.
  III.
  Children IIa.
    1 male, retinitis pigmentosa.
    1 female, retinitis pigmentosa.
    4 (?), normal.
  Children IIb.
    3 (?), retinitis pigmentosa.
    1 (?), nervous disease.
    5 (?), normal.

(Collateral heredity, 2 families; 15 children, 5 affected, 10 not.)

LXXVIII. Wider. (479)

(1, 2) Brother and sister retinitis pigmentosa.

(5, 6, 7) 3 sisters and 1 brother retinitis pigmentosa.

(9, 10) 4 children retinitis pigmentosa.

(22) Patient retinitis pigmentosa; brother hemeralopia.

(23) Patient retinitis pigmentosa; 1 sister retinitis pigmentosa.

(34) 5 children retinitis pigmentosa.

(Collateral heredity 6 families; 19 children, all affected.)

(13) 2 children out of several retinitis pigmentosa.

(14, 15) 2 brothers retinitis pigmentosa; other children normal; 13, 14 and 15 are related; there are many blind and hemeralopic members in the family.

(20, 21) 2 brothers retinitis pigmentosa; other children normal.

(25) Brother and sister retinitis pigmentosa.

(26, 27, 28) 3 males retinitis pigmentosa.

25, 26, 27 and 28 are related by numerous intermarriages of ancestors. Blindness and night shadows frequent in family.

(38) Male retinitis pigmentosa; mother and some of her relations poor vision.

(The above are not statistically available.)

(To be contined.)

ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

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Histological Investigation of a Case of Blepharo-Conjunctivitis Caused by the Diplobacillus of Morax-Axenfeld.

PUSEY, BROWN, Chicago (*Archives of Ophthalmology*, January, 1909), reports a case of typical chronic blepharoconjunctivitis. The bacteriological examination by smears showed the Axenfeld diplobacilli in great numbers, together with Gram positive bacilli of the diphtheria group and Gram positive cocci. Preparations were made of four regions; the lid edge, the tarsal conjunctiva, the conjunctiva of the fornix and that of the ball; the results of the examinations of these were markedly different. In the lid edges the striking change was in the increase of epithelial cells, the new cells growing into the underlying tissue in cone-like masses. Around these ingrowths there was an increase of cells, showing the character of new connective tissue cells with here and there plasma cells and mast cells—there were no lymphocytes and no polymorphonuclear leucocytes. The Meibomian glands were not affected, nor were the glands of Moll, except in one case in which the lumina were filled with leucocytes, but no bacteria found. The tarsal conjunctiva was much thickened, the tissue being composed of a mass of folds, tubules and new supporting tissue. Within the folds were cast-off epithelial cells, mucoid material and bacteria diplobacilli. In the conjunctiva of the transitional fold there was also a great increase of epithelial cells and marked desquamation. All the epithelial cells showed a marked tendency to undergo mucoid change, and the bacteria were not found to penetrate very deeply. The mucoid cells when near the surface discharged their contents in thread-like masses and appeared to hold the desquamated cells together. The conjunctiva of the ball showed the same increase of cells in the epithelial cell layer that existed in that of the transitional fold. The changes were the same, except that there was less tendency to form mucoid cells. Among the desquamated cells along the epithelial cell layer there were Morax-Axenfeld diplobacilli, and also between the superficial cells of this same layer. In answer to the question: why do the epithelial cells of the limbus form ingrowths and the other cells of the bulbar conjunctiva not do likewise? we have the fact that these cells are active under all stimulations; for example, they have been found to be the most active cells in repairing injuries of the epithelial layer of the cornea. In the light of this finding it is interesting to recall the fact that the efforts made to explain the circumcorneal ulcers of chronic conjunctivitis on the basis of traumatism and subsequent infection have been unsuccessful. H. G. G.

A Case of Membranous Conjunctivitis With Systemic Complications.

Hansell, Howard F., Philadelphia, Pa. (*Ophthalmology,* April, 1909), reports the case of a woman, 27 years old, married, and two months pregnant, whose eyes became inflamed seven days before admission to the hospital, at which time there was a moderately profuse purulent discharge from both eyes, pronounced edema of the lids and chemosis, and in the right eye a membrane that extended from the upper to the lower lid, firmly attached to both, and totally excluded the cornea from view. In the left eye the conjunctiva of the upper lid was partly covered by a small loosely-attached membrane. In two days the membrane had disappeared, except from the upper lid. Gonococci were demonstrable for several days. Under the treatment for gonorrheal conjunctivitis, both eyes ultimately recovered. The case was complicated by a severe gangrenous stomatitis. The lips and tongue were swollen and painful, swallowing was almost impossible. The tongue was at least three times its normal size, almost perfectly black, with patches of necrosed tissue. The teeth were loose and the breath exceedingly offensive. Numerous bacteria and cocci were present. Diphtheria antitoxin was used experimentally and seemed to produce improvement. Whether it was beneficial or not is uncertain, but the rapid improvement in the conditions would seem to point to its favorable action.

A. F. A.

Fibroma of the Sclera.

Oppenheimer, E. H., Berlin, Germany (*Ophthalmology*, April, 1909), reports a rare condition, as follows: M. B., a girl 14 years old, came to his dispensary one and a half years ago with her mother; both stated that the girl's sight had been growing weaker for six weeks. The refraction was emmetropic, the vision normal. The girl claimed to see double when reading. The right eye was about 1 mm. lower than the other, but there was no apparent limitation of motion in any direction. When the patient looked up as far as possible and the lower lid was everted, a slight protuberance was to be seen in the lower fornix. It was very hard, could not be removed from the sclera, and was not adherent to the conjunctiva. As much of it as possible was removed and it proved to be a fibroma. The diplobia soon ceased, and while the eye is still 1 mm. lower than the other, the tumor does not seem to have grown again.

A. F. A.

Treatment of Corneal Ulcers.

Donovan, John A., Butte, Mont. (*Ophthalmology*, April, 1909), advocates the use of the electric cautery in all but the more superficial ulcers of the cornea. The applications are made to the edge of the ulcer in order to prevent further infection along the second layer of tissue, the third layer, or Descemet's membrane, limiting the progress of infection inward. If certain areas on the floor of the ulcer seem to be particularly affected, the cautery is to be lightly swept over them. The cautery is ordinarily raised to a black heat, just approaching red. The applications are made at intervals about 1 mm. apart, exactly on the edge between healthy and diseased tissue. If the ulcer is deeper, of a more severe character, or spreading, the cautery should be more vigorously applied along the edge of greater infiltration or advancement. A. F. A.

Perithelioma of the Chorioid and Ciliary Body.

Thomas, Jerome B., Brooklyn, N. Y. (*New York State Journal of Medicine*, November, 1908), says that in the majority of cases of malignant disease of the globe the tumors have been melano-sarcoma, originating in the chorioid. Carcinoma of the chorioid is extremely rare and appears always as a secondary growth, as there is no epithelial tissue in the normal chorioid. About fifty cases have been reported. In the case here described the tumor apparently originated in the chorioid, near its anterior border, and had begun to press upon and infiltrate the ciliary muscle.

Mrs. C. F., 34 years old, had noticed loss of vision in the temporal field for a week, and had suffered no pain. The intraocular tension was slightly reduced, the pupils were equal and there was no sign of inflammation of the globe. The ophthalmoscope showed a rather smooth, brownish-red, nonfluctuating mass just behind the iris on the nasal side. Transillumination confirmed these findings, and after two months' delay on the part of the patient, during which the symptoms increased, the eye was enucleated. A thorough examination of all the organs of the body was made, but no further sign of the disease could be found. Six months later the patient seemed in perfect health. We usually have increased tension within the globe, associated with tumor, and diminished tension in detachment of the retina. The present case did not show increased tension until several weeks after the first onset. The increased tension seemed to depend not on the encroachment of the tissue into the vitreous space, but on an increased transudation of fluid from the tumor, and possibly also upon pressure on the filtration angle by the growth. Sarcoma and carcinoma of the chorioid occur most frequently between the ages of forty and sixty, very rarely in children; glioma of the retina being the tumor most frequently met with in children. If the tumor is located in the anterior portion of the globe, transillumination is a very great aid in diagnosis. If the tumor is found to be carcinomatous a serious prognosis must be given, as we must assume the existence of a primary growth in some other organ. If it should be sarcomatous we may hope, by an early enucleation, to remove the primary growth before metastasis has had a chance to take place. The present tumor was pronounced to be an angio-sarcoma, derived from the perithelium of the blood vessels, a type which is barely mentioned in works on ophthalmology. A. F. A.

The Etiology of Chorioiditis.

Lawford, J. B., London, England (*Ophthalmic Record,* November, 1908), after a historical sketch, says that there are good reasons for accepting the view that all forms of chorioiditis, except the traumatic and that caused by the extension of inflammation from adjoining tissues, are due to infection reaching the chorioid in the blood stream. If the infection is mild the virus does not spread widely from the blood vessels; localized endovasculitis is set up; around these foci, areas of inflammation develop and the chorioiditis is disseminate in type; if the infection is severe the septic material is too virulent for its effects to be limited to certain blood vessels and their immediate neighborhood, inflammatory changes spread throughout the tissue, and a diffuse chorioiditis results. While certain forms of chorioiditis are strongly suggestive of syphilis, and others are less so, there are many cases of the familiar disseminate type in which no evidence can be obtained to support the diagnosis if lues, yet chorioidal lesions of unusual and unfamiliar type have been seen, whose dependence upon syphilis was established by a convincing history, or by the discovery of characteristic lesions elsewhere.

The etiological relation of tubercle to chorioiditis has been generally considered within the last few years, and according to Venneman, it is one of the causes of this disease. Among other diseases which have been at times associated with chorioiditis, are to be included enteric fever and influenza. That there is also a possible connection between certain occupations and chorioiditis may be proved by the case of a man who worked in naphthalin; the chorioidal lesions and the clinical symptoms of central defect of vision and concentric narrowing of the field of vision were attributed to the poisonous effects of naphthalin. The relation which toxic and septic conditions bear to inflammatory lesions of the chorioid is important. The toxic conditions are those which result from the ingestion of poisons of the ptomaine group and by poisons which are created in the tissues of the individual, and may be derived from collections of septic material. The association of chorioidal lesions with disease of the liver and kidneys has been noticed, and seem to be more than accidental. O. W.

A Case of Sympathetic Cyclitis Which Completely Recovered.

Butler, T. Harrison, Coventry, England (*Ophthalmology*, April, 1909), reports the unusual case of a miner, aged 31, who stated that three days previously he was splitting coal with a steel wedge and a heavy hammer, when something flew into his right eye. At the time of examination there was a small, centrally placed scar in the cornea and a corresponding tear in the anterior capsule. The iris was entangled in the corneal wound. The lens was swollen, bulged forward and quite opaque. No trace of a foreign body could be found in any part of the eye and the magnet did not produce any sensation or change. The soft lens was allowed to float out of the wound. The eye became very severely injected and was considered to be infected, but soon became fairly quiet and no optic neuritis was found. Seven weeks later the left eye became injected, but soon quieted down, after which the right eye was removed and no foreign body or any posterior wound of exit could be found. A week later the left eye again showed signs of sympathetic cyclitis, which increased in severity for six weeks. Under mercurial treatment it began to improve, and at the end of six months appeared absolutely normal and has remained so up to the present time with nearly normal vision. A. F. A.

Post-Operative Sympathetic Ophthalmitis.

Campbell, Don M., Detroit, Mich. (*Ophthalmic Record*, November, 1908), says that the theory which seems to explain the existence of sympathetic ophthalmitis best is that of infection, followed by general systemic invasion, the latter condition being the exciting cause of the inflammation in the secondarily affected eye. This view seems to be borne out by the existence of a special form of pathological change found in the exciting eye, which condition was proved by Fuchs, who, without knowing the history of the cases, was able to select 29 eyes from a large number of enucleated ones, which he considered presented the special pathologic change in the uveal tract that should be followed by sympathetic ophthalmitis. In these cases there is also a mild general infection, which is shown by the general constitutional depression, loss of appetite, elevation in temperature and pulse, pain around the exciting eye, and a prickling sensation over the distribution of the ophthalmic division of the fifth nerve. The writer reports six cases of sympathetic ophthalmitis in which these symptoms were all present.

The best means for combating this disease is the use of sodium salicylate according to the method of Gifford; the writer's experimentation with blood counts before and after its use revealed the fact that it is an agent which might be said to produce a medicinal leucocytosis. O. W.

Clinical History and Histologic Study of a Case of Transferred Ophthalmitis Following the Insertion of a Gold Ball Into the Scleral Cavity—Enucleation—Recovery With Useful Vision.

Oliver, Charles A., Philadelphia, Pa. (*Ophthalmic Record*, November, 1908), reports the following case: In 1903, a middle-aged miner consulted him at his clinic at Wills' hospital. Seventeen weeks previously he had been struck in the right eye with a piece of coal. The foreign body was removed from the anterior chamber the third day after the injury. Three weeks later Mules' operation was performed, and seven weeks after this the left eye became inflamed.

The case, when first seen by Dr. Oliver, presented a true picture of transferred ophthalmitis. The secondarily involved eye showed both tarsal and ciliary congestion. The anterior chamber was shallow, the pupil blocked and contracted to the size of a millimeter, the iris tissue degenerate, the tension slightly below normal, and the field of light perception not much reduced. The remaining portion of the right eye containing the artificial globe was tender and its movements impeded. The conjunctiva was filled with granulation material, and there was a profuse mucous discharge. The globe containing the ball was immediately enucleated without rupture. The left eye was subjeced to a careful and vigorous treatment. Large doses of salicylates were used internally, and the local treatment consisted of mydriatics, cycloplegics and miotics with hot stupes. Within a fortnight the eye was free from active and gross signs and symptoms, the tissues were much improved, the pupil, though small and irregularly dilated, was comparatively free in parts, and vision though still reduced to light perception was somewhat increased in area.

Three weeks after the enucleation Dr. Oliver made a clean preliminary iridectomy, and two weeks later removed the cataractous lens with a portion of the thickened capsular debris through a peripheral section made in the same position.

After three months' post-operative treatment he drilled a hole through the remaining capsular material with a Tyrrell's needle without dragging upon the ciliary region. No vitreous was lost in any of the operations.

A fortnight after the final operation the eyeground could be seen distinctly through a central capsular opening, and corrected vision became qualitative.

Four years later, without any recurrence of inflammation, the eye was in fair condition, and the patient enjoyed useful sight. O. W.

Sympathetic Ophthalmia Occurring Thirty-one Days After the Removal of the Injured Eye.

Mathewson, Geo. H., Montreal (*Ophthalmic Record*, November, 1908), describes this case as being that of a well-built man, 42 years old, who consulted him with regard to his left eye, which was very painful. Examination showed that the eye was blind, and had many scars on the cornea, which was staphylomatous. The pain was apparently caused by a fresh corneal ulcer. Appropriate treatment was prescribed and he was directed to return next day, but failed to do so. Two months later, when he had panophthalmitis of the left eye, he was admitted at once to the hospital and the eye was enucleated the following day. He gave the following history: Twenty-one years previously he was struck on the left eye by a flying piece of brass, a fragment of which penetrated and remained in the eyeball. After the injury the eye was very red and painful for a long time. Following this the eye became red and painful several times. Seven years later he was treated for corneal ulcer, and after that had frequent attacks of pain in the eye. The sight which had been weak since the original injury became much worse within the last two months, and the eye was blind before he came to the hospital. After the operation he made a rapid recovery, and left the hospital one week later. At this time the vision was 6/18 in the right eye.

Thirty-one days later he returned to the clinic and said that during the previous day the right eye had become red and painful, and the sight had become bad. Examination revealed a deep pericorneal congestion, a small pupil, a small quantity of exudate with in the pupillary area and an anterior uveitis, with much fine opacity in the anterior part of the vitreous. The optic disk was normal. Vision was reduced to counting fingers at ten feet. He was admitted to the ward and given mercurial inunctions and hypodermic injections of pilocarpin daily. One per cent solution of atropin was instilled into the eye three times daily, and hot fomentations applied every three hours. The pupil dilated evenly and to a moderate degree, but the redness did not diminish nor the vision improve. At the end of a week he was ordered a daily hot bath, which caused profuse perspiration. After that he improved rapidly, and was discharged with a well-dilated pupil, and a vision of 6/36.

O. W.

A Successful Operation on a Cataract Complicated by a Dacryocystitis.

Post, M. H., St. Louis, Mo. (*American Journal of Ophthalmology*, December, 1908), reports a successful operation on a cataract, complicated by dacryocystitis. The age of the patient precluded the extirpation of the sac and he decided to ligate both canaliculi. On May 24th, 1907, having ligated the canaliculi with black silk thread, the conjunctival sac was made as clean as possible and the lens extracted with an iridectomy, care being taken to have a large conjunctival flap. After the extraction the sac, through its fistulous opening, was washed out with normal saline and then filled with a 25% solution of argyrol. Each eye was covered with a thin film of absorbent cotton saturated in 1-5000 bichloride; these were covered by neatly adjusted pads of absorbent cotton and held in place by strips of gauze fastened by contractile collodion; over all was placed a Ring mask.

As soon as possible, washing out of the sac with normal saline was instituted, morning and evening: the result, September 28th, 1907, was vision of 20/30. G. H. W.

Arteriosclerosis as a Factor in Obstruction of the Central Retinal Vessels.

Fridenberg, Percy, New York (*Ophthalmology,* April, 1909), reports two cases which have, as striking features, the development of two quite dissimilar retinal lesions, embolism and venous thrombosis, on the uniform basis of local arteriosclerosis, and present unmistakable evidence of the underlying vascular disease in the apparently unaffected eye.

Case i. A man, aged 69, gave a history of excessive use of alcohol and tobacco for 35 years. He was very strong and a hard worker as driver of an ice wagon. Very suddenly, after a day's work had been finished, he lost the sight of his left eye. There was no pain in the eye and no headache, and the right eye was not affected. After cocaine dilatation of the pupil, the characteristic picture of embolism of the central artery was seen. Examination of the good eye revealed distinct evidence of early arteriosclerotic changes in the medium-sized arteries, consisting of contraction and increased brilliancy of the central light reflex and a general paleness of the red color of the vessels, tortuosity of the smaller macular branches, and decided signs of compression at the arteriovenous crossroads. Physical examination showed cardiac hypertrophy, general arteriosclerosis, increased blood pressure and emphysema. In both eyes the conditions steadily became worse for several weeks.

Case ii. A woman, aged 76, said that, sixteen years before, she had had acute articular rheumatism, leaving cardiac complications, with persistent stiffness and occasional pains in the left shoulder, both elbows and wrists. Several weeks ago she had indefinite dimness of vision in both eyes, lasting about fifteen minutes. About a week ago she found on arising that there was no sight in the right eye. Ophthalmoscopic examination revealed in the right fundus the typical picture of retinal apoplexy. The arteries were narrower than normal, but there was no marked evidence of disease of the artery walls. The veins were greatly dilated, excessively tortuous and hidden in many places by hemorrhages and oedema. The left fundus showed no marked lesions, but careful examination revealed the presence of progressive venous pulse and the vessels themselves showed signs suggestive of arteriosclerosis. All arteries were decidedly narrow. At one point a branch of the central vein was obscured by a crossing artery. The arrangement, size and shape of the chorioidal vessels were decidedly suggestive of angio-sclerosis as they were narrow, twisted, snarled, and looked stiff, crinkly and shrunken. Soon after the discovery of the disease picture of embolism of the central artery by v. Graefe in 1859, doubt began to be expressed as to actual embolism being the only and exclusive cause of the clinical picture, until today there is a general recognition of the comparative frequency of arterial obstruction, due to local processes as the main features in the picture of so-called embolism. The embolic nature of this affection has not been anatomically proven beyond a doubt in even a single case. Knapp was probably the first to express the opinion (1869) that thrombosis of a retinal vein may give rise to retinal hemorrhages in the area it supplies. Here the blindness is sudden, the veins are markedly dilated and tortuous, with comparatively narrow arteries. Among recent writers, Harms has given a most careful and complete account of the microscopic findings in disease of the retinal arteries and veins. Primary sclerosis of one vessel may create thrombosis of the other by obstructing the blood current and this, in turn, may increase the sclerosis of the originally diseased vessel or even lead to complete thrombotic closure of its remaining lumen. In most cases the primary affection of the trunk extends to the retinal branches, venous or arterial, before the main channel is completely closed by secondary thrombosis. Complete closure of both vessels is almost invariably due to the local disturbance of circulation, caused by the primary disease of one vessel. Sclerosis of the vessels generally takes place as a primary thickening of the intima. Hyaline sclerosis is the most common form in the retina. The media are not affected. The main signs of arterial sclerosis may be mentioned as irregularity of calibre, tortuosity of the small branches, dilatation of the veins, visible changes of the vessel walls and, most important of all, constriction or indentation of the vein by the hardened artery where they cross each other. An interesting feature connected with vascular disease of the retina is the occurrence of temporary obscuration of vision, usually attributed to vascular spasm. A history of such attacks of transitory blindness has been elicited in many cases in which complete obstruction finally took place in the form of embolism or thrombosis. The fact that these ocular conditions depend on general vascular disease must render futile any hope of marked amelioration of symptoms by mechanical massage of the globe or by the administration of vaso-dilators, except in very rare cases. Coats says that angiosclerosis depends upon the two factors of senility and pathological stimulus, which about covers the ground of etiology and the treatment resolves itself into the usual treatment of the general underlying conditions. A. F. A.

Prealbuminuric Retinitis.

MARTIN, H. H., Savannah, Ga. (*Ophthalmology,* April, 1909), reports cases which illustrate the proposition that chronic Bright's disease is not essentially a renal disease, but that it is primarily a chronic inflammation of the arterioles and capillaries of the general circulation; a hyaline fibroid change in the vessel walls, which leads to thickening and loss of elasticity that it is caused by a poison or set of poisons, the nature of which is not known; that such kidney lesions may and do appear as incidental and not essential conditions; and that the essential lesions are certain degenerative changes affecting many tissues and widely disseminated. Among the causes of the disease may be mentioned a general toxaemia from intestinal putrefaction. The most prominent features of so-called albuminuric retinitis are the white spots, generally arranged about the macula in a star-like order, linear, flame-shaped hemorrhages along the course of the blood vessels, the retina hazy, the veins enlarged and tortuous, while the arteries remain unchanged or contracted, with more or less dimness of vision. The condition here called prealbuminuric retinitis differs from this only in degree and may be considered as an earlier form of the same disease. There are no white spots, no perceptible changes in the blood vessels, the hemorrhages, when present, are flame-shaped and lie along the courses of the arteries, are decidely transient, very faint and easily overlooked, and there is no diminution of vision.

Case i. Mrs. B., aged 40, married, two children; apparently in good health, except for chronic indigestion. The fundus changes were those just mentioned as prealbuminuric. There was no albumin. Two years later she completed a pregnancy, during which she suffered from dropsy and partial loss of sight of the left eye. In the left eye were found white spots, no hemorrhages; in the left a typical albuminuric retinitis. No albumin was found in the urine, but numerous casts were present. She died from puerperal eclampsia two years later.

Case ii. Mrs. H., aged 30, married, no children, gave a negative history except of chronic indigestion. The above conditions were present in both eyes.

Case iii. A man, aged 47, had suffered from chronic indigestion for many years. He showed the same conditions as above. No albumin was found in his case, nor in Case II.

A. F. A.

Pain of Acute Glaucoma Relieved by Cocain Applied to Meckel's Ganglion.

Ewing, A. E., St. Louis, Mo. (*American Journal of Ophthalmology,* December, 1908), opens an interesting field of study by successfully relieving the pain of acute glaucoma with a cocain application to Meckel's ganglion. The success obtained by Greenfield Sluder in relieving obscure headaches by applying a 20% solution of cocain to Meckel's ganglion determined Ewing to try this method in acute glaucoma. He cites one case: patient seen in April, 1905, for the first time, suffering from acute glaucoma in the right eye, the pain of which was only relieved eventually by an iridectomy. On December 5th, 1908, patient developed an acute glaucoma in the left eye. The lids were red and puffed, the anterior chamber shallow, the pupil 4-5 mm. in diameter, the globe hard and moderately injected. The disk was hyperaemic with pulsation of the lower temporal artery, the vision 20/19, formerly 20/15. The field was not taken. Escrin 0.5% oil solution was used and the patient referred to Greenfield Sluder, who found the region of the nose on the left side adjacent to Meckel's ganglion, decidedly inflamed and swollen. He made an application of 50% solution of cocain to this region and within a few minutes the pain in the eye and temple had ceased entirely. Pilocarpin, 0.5% solution, was prescribed then, to be used every four hours. Next morning the vision was 20/15, the lids were less puffed, the tension was normal, the globe very little injected, the anterior chamber shallow, the pupil 3.25 by 4.5 mm. in diameter, elongated vertically and eccentric, there was no arterial pulsation, the disk was a little hyperaemic, there had been no pain during the night and no sedatives had been taken. At time of writing, nine days later, the globe was quiet, the vision and field normal, and there was no evidence of the attack except that the pupil was eccentric and elongated vertically. In the eye eserin 0.5% and pilocarpin 0.5% were used alternately every four hours during the day. The inflammation in the nose had subsided under daily applications of formol 1%, the cocain having been used only once. G. H. W.

Innovations in the Operative Treatment of Persistent Glaucoma: A Study of the Substitutes for Iridectomy.

Fridenberg, Percy, New York (*Ophthalmic Record,* December, 1908), says that while iridectomy is still considered the sovereign remedy for the majority of cases of glaucoma, many operations have been suggested with a view of rendering the effects of iridectomy more permanent, facilitating the success of the operation or replacing it. Among these procedures are posterior sclerotomy, opticociliary neurectomy, and extirpation of the ciliary ganglion. These modifications were suggested by the dangers of the operation under certain conditions of extreme tension, shallow chamber, wide pupil, or hemorrhagic tendency. Among these substitutes for iridectomy we may distinguish between minor or temporary procedures intended to reduce tension due to a transient cause, or where the mutilating effect of iridectomy is to be avoided, and the possibility of atropin treatment continued, and others which consist in opening a large area of iris tissue for filtration and the freeing of an occluded iris. In simple glaucoma with good central and peripheral vision and slight increase of tension; in chronic glaucoma with plus tension, without pain, and with rapidly diminishing field; in atrophy of the iris where iridectomy cannot be performed; in recurrence of glaucoma after iridectomy, or its development by dislocation of the lens; of serous iridocyclitis with deep anterior chamber; and in glaucoma with irideremia, sclerotomy is, according to Czermak, the operation of choice. In operative procedures based on intraocular filtration the idea is to open communication between the anterior chamber and some part of the uveal drainage tract. The scleroiritomy of Nicati, 1892, iridosclerotomy of Knies, iridosclerotomy of Panas, combined sclerotomy of De Wecker, 1894, incision of the iris angle, Vincentiis, 1894, sclerochoriotomy of Querlenghi, 1908, cyclodialysis by Heine, are all well described with their advantages and disadvantages, but the article is too long to be reduced to an abstract. O. W.

Restoration of Sight After Nearly a Month's Blindness From Glaucoma.

MINOR, J. L., Memphis, Tenn. (*New York Medical Journal,* December 5, 1908), reports the case of a patient, aged 57, who, while traveling in California over two months before, had suffered from a sudden and severe pain in the left eye, which lasted for thirty-six hours. A few days later she had a milder attack in the right eye and vision became dimmed. Such attacks were repeated every few days with increasing impairment of vision, and about six weeks after the first attack the patient became totally blind. Six weeks after the first attack she consulted an oculist, who decided that nothing could be done for the restoration of vision. The long-continued pain and anxiety had greatly exhausted the patient when she reported to the writer for advice. There was no perception of light, the tension was + 1, the scleral vessels were enlarged, the anterior chamber was shallow, the pupils dilated, the media hazy, in both eyes. Pain was more or less constant and severe. For the relief of the pain, iridectomy was done in both eyes and recovery was uneventful. At the end of a week she could see the hands of a clock across the room and could tell time by a watch. The media cleared, the tension became normal. A glaucomatous cupping of 6 d. and a white nerve head were to be seen. Corrected v. o. d. = 20/30 — v. o. s. = 20/40. Two years later no change had occurred in the right eye, but the vision in the left could not be brought above 20/100, and it has since diminished to perception of movements of the hand at two feet. A. F. A.

Increased Tension in Ocular Diseases of Infancy and Childhood.

Brown, John Edwin, Columbus, Ohio (*Ophthalmic Record*, December, 1908), says that while the possibility of a disturbance of the relations between the intraocular pressure and the resistance of the supporting tissue in the young is a well-established fact, this deviation is more easily recognized in the adult than in infancy or childhood, owing to the elasticity of the coats of the infantile or juvenile eye; and as increased tension in the adult proves disastrous to vision, so similar disturbances in the young may result in the same way. While inflammatory glaucoma is chiefly a disease of adult life, it is quite possible that every ophthalmic surgeon has seen cases in patients between ten and twenty years old. The writer gives the history of four such cases which serve to call attention to the relation of intraocular pressure to the resistance of the ocular coats. Disturbances of the intraocular pressure may be an element in a number of diseases of the eye in infancy and childhood. It may disappear without causing any impairment of vision; it may injure the function or it may give rise to secondary changes which will in time cause blindness. O. W.

Refractive Myopia.

Valk, Francis, New York (*Journal of Ophthalmology and Oto-Laryngology*, October, 1908), says that most authors, while they have recognized the existence of myopia due to increased convexity of the cornea, have attributed little importance to that condition. The bearing of that condition upon the prognosis of myopia has also been overlooked. The general statement has been that myopia was, as a rule, axial and the prognosis unfavorable. The contention of the paper is that while axial myopia ordinarily may be considered pernicious, that of curvature is, as a rule, benign. The normal radius of curvature of the cornea may be stated as about 7.65 mm., and a large majority of the author's cases of myopic eyes have presented a much lessened radius of curvature. Although some myopic eyes have an increased radius, and, on the other hand, many hypermetropic eyes have a diminished radius, such cases constitute a very decided minority. The statistics presented by the author from his own case and from the reports of others bear out this statement, but the point is made that while the anterior surface of the cornea does indicate the refraction in many cases, the posterior surface of the cornea may not be parallel to the anterior surface and may itself act as a refracting surface and be one of the factors that complete the total refraction. In Tscherning's measurements we may find a demonstration of this in his investigation of astigmatism "against the rule." Here we find that the posterior surface of the cornea may present an astigmatic curve and the radius of curvature of the posterior surface is far less than that of the anterior surface of the cornea. If the anterior curve has a radius of 7.65 mm., and the radius of the posterior surface is less, that, in itself, would produce a myopia of curvature, and if the anterior surface were myopic this condition would still further increase the degree of myopia. Still further, if a difference of 1 mm. between the meridians of greatest and least curvature of the cornea will produce an astigmatism of six dioptres, then we may reasonably state that, in a case of simple myopic astigmatism, the myopic element must be caused by the curve of the cornea, and, if so, may not this lessened radius of curvature, if occurring in both meridians of the cornea, produce a simple myopia? Refractive myopia, then, may be defined as that condition of the eye in which the anteroposterior diameter may be normal, but the curvature of the cornea such that its radius is much less than the normal, 7.65 mm., so that the retina is behind the principal focus of the eye. The diagnosis can be made by measuring the anterior surface of the cornea by means of the Javal ophthalmometer. The prognosis is always good according to the author's experience. The treatment consists of ordering the full correction of the myopia and astigmatism as found under the influence of atropine, so modified as to secure clear vision of each eye without strain of the accommodation. After such correction, patients seldom need a change of glasses. A. F. A.

On Intraocular Disease Brought on by Disease of the Nasal Sinuses.

Gradle, H., Chicago, Ill. (*Ophthalmology*. April, 1909), discusses the possibility and probability of extension of sinus diseases to the ocular structure. The orbit is so largely surrounded by the different nasal sinuses that it is not surprising that extension, direct or indirect, should take place. Diseases of the lacrimal passages are very commonly caused by extension of infection from the nose. Nasal suppuration is an important factor in the production and perpetuation of phlyctenular or scrofulous keratitis. Obscure pains in and around the eyes and obstinate asthenopia often yield to successful treatment of the coincident nasal inflammation. The optic nerve may become affected by direct extension from the posterior ethmoid cells or the sphenoid sinus. The characteristic symptom indicating involvement of the optic nerve with no visible optic neuritis is stated by Birch-Hirschfeld to be a small central color scotoma. The object of the present paper is to present four cases of chorioidal disease associated with sinus disease on the same side.

Case i. Chorioiditis with Descemetitis, associated with inflammation of corresponding left maxillary sinus. Not influenced by the treatment of the sinus disease.

Case ii. Acute central chorioido-retinitis, associated with maxillary empyema, both of which recovered under treatment.

Case iii. Neuro-retinitis with uveitis, associated with maxillary empyema, which improved only after drainage of the sinus and which showed recurrence when the drainage became temporarily blocked.

Case iv. Isolated patch of recurring chorioiditis, associated with sphenoidal or posterior ethmoidal suppuration. In 1903 the patient complained of aching in the left eye with blurring and floating specks and more or less headache, with blurred vision on that side. She was soon relieved and did not return until 1908, when she again presented the same symptoms, coinciding with an acute cold in the nose. An area of fresh as well as one of old chorioiditis was seen. There was hypertrophy near the posterior ends of both right and left turbinates and a deflected septum. The left vision was reduced to 20/lxxx. Treatment to reduce the hypertrophy of the nose was followed by improved vision and diminished pain, and an operation on the turbinates improved her condition still further. A tampon to stop bleeding was allowed to remain in position for three days, when she returned with pain and blurred vision. The removal of the tampon was immediately followed by disappearance of these symptoms. Through what channel the infectious material reached the interior of the eye is not known.

It is noteworthy that in each of the present cases there was haze of the adjoining vitreous. This was especially emphasized in Case IV by its prompt reappearance when the discharge was pent up by a tampon. A. F. A.

Some Facts Concerning Family Exophoria. Being a Preliminary Contribution to a Study of the Relations of Cranial Build and Orbital Formation to the Status of the Extrinsic Ocular Muscles.

Reber, Wendel, Philadelphia, Pa. (*Ophthalmic Record,* December, 1908), states that the hereditary tendency of intrinsic exophoria and intrinsic hyperphoria has been emphasized by a study of two or three generations of families in which it was claimed that their headaches and neuralgia were hereditary. It was found in several instances that individual cranial peculiarities marked these particular members of such families who claimed that their headaches were the same as those of their mothers, fathers, etc.

It is generally admitted that the balance or imbalance of certain ocular muscles is to a great extent influenced by cranial conformation and orbital build, and it follows that the possibility of hereditary anatomical malformation should be excluded in every case before accepting the theory of hereditary headache. According to Stevens, as individuals are long skulled, medium skulled, or broad skulled, there will be corresponding positions of the visual axis. About two years ago it occurred to the writer that the diagrams used by hatters might be used in a study of cranial peculiarities, and he began sending members of families in whom there were two or more exophorias for measurements. These diagrams represent the anteroposterior and the interparietal diameters of the skull fairly well. Twenty measurements were secured in this way and represented the heads of twenty men. In the families inquired into only two generations were investigated. Seven families comprising fifty-six members, were studied. Of these forty were personally examined by the writer. One was orthophoric, five were esophoric and thirty-four were exophoric. Of the latter twenty-one submitted to head measurements, and of these eighteen were long-skulled and three medium-skulled, which would seem to indicate that long-skulled-ness predisposes to exophoria. This study was undertaken in the belief that peculiarities in the cranial build might have much to do with orbital dimensions, and consequently with the direction of the visual axis. O. W.

Are Faulty Orbital Developments Which Cause Heterophoria the Results of Adenoids?

CULBERTSON, L. R., Zanesville, Ohio (*American Journal of Ophthalmology*, December, 1908), cites the malformations produced by adenoids, such as high arching of the hard palate, crowding and overlapping of the teeth, deflected septum, and encroachment of the turbinates; and goes on to say that if the hard palate be arched this would prevent the inner angle of the orbit from descending, thus causing the orbit to slant downward and outward, which would give a plus declination to the orbit and the eye would have a plus inclination. Not only would these imperfect developments of the upper jaw cause plus or minus declinations, but they would give the orbit an upward or downward pitch with the horizon. G. H. W.

Some General Considerations Concerning Tuberculosis of the Eye.

VERHOFF, F. H. (*Ophthalmic Record,* December, 1908), says that the subject of ocular tuberculosis may be better understood by considering it in the character of the tuberculous process rather than that of the location of the lesions. In this way the first question is whether or not the infection is primary. In the majority of cases the ocular disease is simply a part of a systemic infection, and primary tuberculosis of the eye is too rare to be of practical importance. Tuberculosis of the eye may be of three types: acute, chronic, and phlyctenular. The acute type is characterized by its tendency to destroy the eye and by caseation of the lesions., The chronic type is of slow course, has a tendency to show exacerbations and remissions, and there is no caseation. It does not completely destroy the eye, but causes atrophy to some extent, and in the event of development of secondary glaucoma may require enucleation. The phlyctenular type is the most common and most important, and is always dependent upon systemic tuberculosis. In the opinion of the writer it is advantageous to make the subcutaneous tuberculin test in diagnosing all cases of ocular tuberculosis. O. W.

A Case of Amaurotic Family Idiocy.

Fryer, B. E., and Lichtenberg, Jos. S., Kansas City, Mo. (*Ophthalmology,* April 1909). History.—Male, aged 18 months, Russian Jew, appeared normal until the fourth month. He then showed diminished intelligence, had convulsions from the twelfth to the fifteenth month. Present state: The child is quite blind, the eyes divergent, the pupils small and do not react to light, the head rolls about. He cannot walk, talk or sit up, the muscles are flaccid, the cranial measurements below the normal, the optic nerve atrophied, the retinal vessels small and few, the characteristic central cherry red spot at the macula is absent. Sachs sums up the chief symptoms of this condition as follows: 1. Mental impairment from the first month leading to absolute idiocy. 2. Paralysis of the greater part of the body. 3. Reflexes vary. 4. Ultimate total blindness. 5. Marasmus and fatal termination, as a rule, before the age of two years. 6. The occurrence of the affection in several members of the same family. A. F. A.

The Dependence of Ophthalmology Upon Other Branches of Medicine.

Green, John, Jr., St. Louis, Mo. (*Ophthalmology,* April, 1909), says that at present the tendency of ophthalmic practice is away from the former habit of isolation from and independence of the other departments of medical practice and toward greater co-operation with and dependence upon related branches of medical science. In point of fact, it is quite impossible to have a comprehensive understanding of the clinical and pathological aspects of such a disease as ocular tuberculosis without a knowledge of the aspects of tuberculosis in general. This is but one of the many ocular changes which are closely related to general physical changes and often caused thereby. With the passing of this earlier phase of ophthalmic thought many extravagant notions and claims began to be advanced of the great and almost entire dependence of a large number of mental, nervous and general conditions upon reflexes due to irregularity of ocular processes and functions, and what was undoubtedly true to a certain extent has been brought into ridicule by such extravagant statements. This phase is fortunately passing and ophthalmic practitioners are daily realizing that they will meet with the greatest success only with the collaboration of their colleagues in other branches of medical work. Accuracy of diagnosis can be attained, not only by examination of the organism as a whole, but frequently by the knowledge gained by the application of the newer diagnostic tests. Three case histories are introduced, illustrating the value of tuberculin in clearing up what would otherwise have been doubtful and obscure conditions and leading to more rational and scientific treatment. Many asthenopic symptoms arise with very little or no refractive error which are but local indications of neurasthenia, hysteria or subnormal accommodative power due to depressing constitutional conditions. The not uncommon cases of ocular palsies, pupillary inequalities, defective visual fields, inflammation or atrophy of the optic nerve, are so often associated with brain tumors, multiple scleroses or tabes, as to illustrate how wisely the ophthalmologist and neurologist might co-operate to the advantage of all. It is now universally appreciated that various functional and organic diseases of the eye and its adnexa are due to diseases of the nasal cavity and its accessory sinuses, either by pressure or metastasis. With the re-establishment of drainage, the ocular symptoms rapidly subside. Pelvic congestion and disease are frequently the cause of ocular disease, and much literature has appeared to establish this fact. The close relation between otitic disease and the eyes is well recognized and needs no more than mention. Many cutaneous diseases are closely related also, either by the presence of similar infecting agents or due to constitutional conditions. A. F. A.

ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

(GREAT BRITAIN AND THE ENGLISH COLONIES.)

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DETROIT.

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Extraction of Particles of Metal from the Interior of the Eye. A Clinical Study of Fifty Cases.

WHARTON, JOHN (*Ophthalmoscope,* May, 1909). After speaking of the difference of opinion that still exists concerning the comparative value of the small and large magnets for removal of metal chippings from the interior of the eye, the author reports his results of fifty consecutive cases. Of the eyes saved, all were examined at a period ranging from eight months to four and one-half years after the accident. The magnets used were the hand magnet of Hirschberg and the large modified Haab's electro-magnet.

The cases are classified under the following headings:

A. Situation of wound of entry.
B. Time intervening between accident and operation.
C. Operation.
D. Size and shape of piece of metal.
E. Results.

A. Situation of wound entry.
(a) In 37 eyes the wound was in the cornea.
(b) In 10 eyes the wound was in the ciliary region.
(c) In 3 eyes the wound was in the sclera.

(a) Corneal wounds. "Undoubtedly the most favorable class of case is that in which the piece of metal, having passed through the cornea, comes to rest somewhere in the eye anterior to the suspensory ligament of the lens or its posterior capsule." In all of these cases, twelve in number, the eye was saved and the resulting vision excellent. Cases in which the metal passes through the cornea and ultimately rests in the vitreous chamber are more serious, especially if irido-cyclitis develops. Of these there were 25 cases, of which 14 eyes were saved, and 11 lost.

In only 4 of the 37 corneal injuries was there any prolapse of the iris, the absence of which in a case of complete corneal wound is, in the opinion of the author, an indication that the foreign body has passed into the eye, and is resting either in the eye or beyond it.

(b) Wounds involving the ciliary region or the ciliary body. Early operation is of great importance as the metal can be removed before the wound has become sealed up. Meridional wounds give a better prognosis than oblique or equatorial injuries. "Provided that the wounds remain aseptic, I do not think that the ciliary zone injuries are any more serious than the corneal injuries in which the metal has passed into the vitreous chamber. There are 10 of these cases reported, of which 5 were saved and 5 were lost. Of the five lost, three were from plastic irido-cyclitis, one from purulent chorioiditis, and one from panophthalmitis.

(3) Scleral wounds. Even extensive scleral wounds, if meridional, the wound aspect and the operation performed early, the prognosis is as good as that from wounds of the ciliary body. Of the 3 cases reported, two were saved and one was lost. In none of the cases did sympathetic ophthalmitis

follow the injury. The author recommends early enucleation if irido-cyclitis be present, with poor vision, tender globe, and a tendency to subnormal tension.

(B) Time intervening between accident and operation.

In every case the operation was done as soon as possible after admission to the hospital. Radiograms were made in doubtful cases. The prognosis is more serious the longer the foreign body remains in the eye, as plastic exudate which forms surrounds the foreign body and leads to traction, which may result in an irido-cyclitis. He recommends that the giant magnet be not used on these cases of long standing. Of the 26 eyes operated on the same day as the accident, 18 were saved; of the 9 cases operated the second day, 6 were saved; of 2 cases on the fifth to seventh day, both were saved; and of three cases from the sixteenth day to the fifth month, all were saved.

(C) Operation.

All were performed under cocaine anaesthesia and all possible aseptic precautions. The methods adopted were as follows:

(I) Where the metal had passed through the cornea and was resting on or behind the iris, a limbal corneal section was made with a Graefe knife, the armature of a hand magnet introduced into the anterior chamber, and iridectomy done if necessary.

(II) In a corneal wound with the metal chip resting in the lens, it is drawn into the anterior chamber with a giant magnet, and if the corneal wound was large enough and recent, through the original wound. When the corneal wound was sealed up, a small limbal section was made, and the metal removed from the anterior chamber by the small hand magnet. The cataract was dealt with later.

(III) Metal resting in the vitreous chamber.

(a) In recent injuries with a scleral or ciliary wound, the metal was withdrawn along its path of entry by a giant magnet.

(b) When the wound of entry is corneal and recent, and the foreign body rests in the vitreous, the giant magnet is most useful. By careful manipulation of the patient's head, it is possible to draw metal through the lens if the latter has been injured by the accident, or through the circumlental space into the anterior chamber. It is difficult to draw the metal through the circumlental space and then through the pupil as usually the iris becomes entangled, necessitating limbal section with iridectomy. The iris should be carefully freed from the corneal wound. Occasionally when the giant magnet has no influence on the metal at first, sudden making and breaking of the current may aid. The smallest chips are the most difficult to remove, and the current must be carefully regulated as in one case in which the giant magnet was more than a foot away from the eye, the whole iris was torn from its base and pulled through the corneal wound attached to the metal. In one case a second piece of metal was removed three days after the first piece had been removed and thought to be the only piece present.

(c) When the metal has been in the eye for several days, the influence of the giant magnet is greatly lessened, and in two cases failed to draw the piece into the anterior chamber. In such cases the piece is localized by Davidson's apparatus, a meridional scleral incision is made about four mm. in length and the magnet again applied, into the lips of the wound if necessary. The author "has never found it necessary to probe about in the vitreous chamber with the small magnet armature whilst searching for the metal." In three cases the metal was removed from the anterior chamber and in one case from the lens by forceps. In the opinion of the writer, hypopyon is not a contra-indication for operation, as this condition was present in two cases. In one case in which there was intense inflammation after the operation, normal vision was obtained after treatment with subconjunctival injections of cyanide of mercury and acoin, hot fomentations and atropine.

(D) The size and shape of the piece of metal. The chippings were classified as spicules, scales and chunks. The spicules give the most favorable prognosis, while the scales caused the most damage, especially when large. The chunks usually lodged in the anterior portion of the eyeball.

(E) Results.

Of the fifty cases reported, 33 eyes were saved and 17 were lost. The resulting vision varied from light perception and shadows to normal vision, which was obtained in 9 cases. Detachment of the retina resulted in 5 eyes, in all of which the giant magnet had been applied. Absence of opacity in the vitreous was noted in 3 cases in which the piece of metal had rested in the coats of the eye in the vicinity of the macula and disk. In one case the choroido-retinal scar caused an irregular contraction of the visual field to the nasal side.

Of the 17 eyes lost, 13 were from irido-cyclitis; 2 from purulent choroiditis; and 2 from panophthalmitis.

In conclusion, the author emphasizes the importance of having both hand and giant magnets at command when operating, as he considers that the small electro-magnet holds a very important place in ophthalmic surgery. W. R. P.

The Remote Results of Ocular Motor Palsies.

Antonelli, A., Paris (*Ophthalmoscope,* April, 1909). The author limits his discussion to the remote results of ocular motor palsies, not concerning himself with cases of recent paralytic strabismus which cannot be confused with concomitant squint, with the fleeting palsies of pretabes or with progressive nuclear ophthalmoplegia.

The ocular motor palsies of confirmed tabes or syphilis of the nervous system, which becomes only incompletely cured, lend themselves to the study of persistent paralytic strabismus, also sub-acute ophthalmoplegias of diabetes, or toxic conditions (diptheria, pneumonia, scarlet fever, etc., alcohol, nicotine, lead) may have analogous remote results.

All the cases are considered from a static and dynamic standpoint, that is, as regards the deviation and the defects of motility.

He gives as a type of the cases considered, the palsy of the sixth pair, of syphilitic origin, in which the paralysis resists treatment and leaves certain objective defects, which appear in the form of more or less obvious strabismic deviation of the affected eye, secondary deviation of the other eye, etc. As time goes on this paralytic strabismus will present more and more the character of a concomitant strabismus. The paralysis has been transformed into a simple paresis, one portion of the abduction being regained. Palsies of the third pair do not lend themselves to the study of the remote results of paralytic strabismus and of the analogies of the strabismus with the so-called concomitant strabismus, although some of the cases of paralysis of the common ocular motor, which reduce to simple defective adduction, end by presenting the same characteristics of concomitant divergent strabismus. Some secondary deviation of the sound eye may remain to show the paralytic origin of the strabismus. This secondary deviation, however, grows less and may in time entirely disappear. This same thing happens in the case of nystagmic oscillations, which appear sometimes when monocular fixation with forced adduction and abduction of the squinting eye are demanded, while the other eye is covered.

The symptomatology of palsies of the common ocular motor are much more complex than that of palsies of the abducens, not only on account of the number of muscles concerned, but also on account of the partially crossed action of the ocular motor, that is, (Bernheimer) the inferior rectus receives crossed innervation; the inferior oblique an innervation the major part also crossed; the inferior rectus both crossed and direct; the superior rectus mainly, and the levator palpebrae entirely direct innervation. (This crossing takes place in the peripheral neuron.) In nuclear or trunk palsies, a unilateral lesion of the common ocular motor may thus give crossed types.

When the early and dominant signs of palsy of the third pair, (ptosis and defective elevation) have disappeared, diplopia may remain. Crossed diplopia, persisting because adduction has been affected in both eyes (direct and crossed innervation of the internal recti) more marked in convergence, and may be associated with vertical diplopia. "One must think in such a case of residual affection of motility in the eye on the sound side, especially in the actions of the inferior rectus and inferior oblique, the former receiving an innervation totally crossed and the latter an innervation mainly crossed."

The author suggests that paresis of a muscle, which may be overlooked during the measurement of the field of fixation of the affected eye alone, will reveal itself when the binocular field is determined. The latter is always restricted in such a case and the limit of binocular field of fixation toward the affected muscle is the expression of paresis of associated movement.

The analogy between the remote results of paralytic strabismus and concomitant strabismus suggests that certain cases of concomitant strabismus may have had their origin in an ocular motor paralysis or paresis in early life, especially those cases of permanent unilateral convergent squint with normal vision of the squinting eye.

As time progresses the secondary deviation becomes less and less, until after several months, if the paralysis is transformed into a paresis, it becomes less pronounced than the primary, a perfect analogy between the character of the diplopia in the paralytic cases and in concomitant strabismus.

The author does not believe in a secondary contracture of the antagonist, but holds that there is a shortening of the muscles by adaption, after complete persistent paralysis of the antagonists, the strabismic deviation being due to loss of tonus in the paralyzed muscle. In cases of long standing strabismus, whether it be paralytic or concomitant, there may be an organic modification in the volume and length of the muscle homologous to the deviation. The loss of tonus does not always come on very rapidly, which explains why a palsy of the sixth pair, for instance, may remain for some time without strabismic deviation.

The author sums up his paper in the following way:

To know the remote results of ocular motor palsies will aid us in prognosis, and also in retrospective diagnosis, which may be of great importance in the history of a given case. Old-standing palsies of the sixth pair which have lasted a longer or shorter period (several weeks or months) leave a convergent strabismus having all the characters of ordinary so-called concomitant squint, and that the more readily the younger the subject is. Old-standing palsies of the third pair, a little more rarely because their symptomatology is more complex, leave behind them a simple divergent strabismus, or at least a manifest insufficiency of convergence, absolutely analogous to the so-called concomitant divergence seen, for instance, in myopes. Isolated palsies of the fourth pair are too rare, at any rate among my own observations, to allow us to determine the remote results. W. R. P.

Optic Neuritis in Cerebral Tumors.

Paton, Leslie (*Ophthalmoscope*, March, 1909). After describing the changes in the fundus as they take place in the cerebral tumors, the author takes up the likelihood to optic neuritis in relation to the location of the tumors. From a careful study of 102 cases he finds that homolaterality is not the rule, the choked disk being of higher degree quite as frequently on the opposite side from the tumor as on the same side. He advances the interesting hypothesis that the loss of vision in these cases is not so much due to the edema of the papilla as to intraventricular pressure affecting the chiasma.

The three terms, choked disk, papillitis, and optic neuritis, are of unfortunate nomenclatures, implying a pathology not believed to be true. The term "papilloedema" is less objectionable in this respect.

The first observable change in the disk is a blurring of the upper and lower margins, often burying three-fourths of the disk edge, and leaving the outer one-fourth fairly clear. Veinous congestion is present, but the author does not believe it precedes the blurring of the disk margins. The process soon involves the whole disk, the veinous congestion becomes worse and the veins tortuous. The swelling of the disk increases and is measured best by comparison with the retina just beyond the macula. Hemorrhages may be present about the outer margin of the swelling, occurring in 50 per cent. of all cases.

Macular figures he considers more important from a prognostic point of view. They consist of fan-shaped elevations, 8 to 20 spokes to the fan, lying between the disk and the macula and occurring in 15 per cent. of all cases. They seem to be an expression of the overflow of the edema, mainly in nerve-fiber layers, the cases in which they are present showing on the average 0.6 D. greater swelling then the general average. The average swelling, with macular figures present is 5.1 D.; without macular figures is 5.4 D. Though occurring in connection with tumors in any part of the brain, they are more frequent in cerebellar tumors.

About 80 per cent. of all cerebral tumors develop optic neuritis to some extent, the remaining 20 per cent. show no fundus change. It always accompanies cerebellar and temporosphenoidal tumors; and nearly always tumors of the ventricles optic thalamus and mid-brain. Exceptionally, in the two latter regions, the pressure directly on the chiasma develops a pressure atrophy instead of a neuritis. "The great bulk of the cases which do not get optic neuritis are pontine and subcortical tumors, i.e., tumors in the white matter of the cerebral hemisphere." Tumors in these regions cause a swelling of the disk only when they spread into the grey matter. Optic neuritis is most severe, when it does occur, in tumors of the cerebellum, the pons, the optic thalamus and mid-brain; and least severe in parietal and subcortical tumors.

The nature of the tumor itself has little to do with the causation of choked disk, except in so far as the nature determines the site of the tumor. While fibromata and tuberculous tumors are nearly all associated with optic neuritis, the malignant growths, sarcomata and carcinomata, are frequently without neuritis, although we would expect a greater development of toxines from the greater breaking down of the brain substance.

The author has selected 102 cases, which have been watched through the various stages of neuritis, and not including any cases of commencing subsidence or atrophy. In 53 cases there was not more than 0.5 D. difference in the two eyes. In 25 cases the swelling was greater on the side of the tumor, and in 24 cases the swelling was greater in the contralateral eye. Out of 30 in which the commencement of the swelling was noted, 13 developed simultaneously in both eyes, 11 commenced first in the contralateral eye, and 6 developed first in the homolateral eye. An important point was that in 4 cases, in which the neuritis developed only in one eye, in each instance it was in the eye on the opposite side from the tumor .

In conclusion the author tentatively suggests the possibility that the loss of vision in connection with cerebral tumors is not, of necessity, due to the optic neuritis. Attacks of temporary amaurosis are frequently seen in association with early signs of tumors, in which there is no papillitis. Cases are recorded in which there was little or no loss of vision during the development or subsidence of the choked disc; and many cases recover vision much more rapidly after operation than after the neuritis subsides. All of which points to some other cause for the loss of vision, namely, "the direct pressure of a distended ventricle on the chiasma." Therefore "if a palliative trephining has to be done with a view to saving vision, the time to do it is not necessarily on the first development of the neuritis, but on the first signs of visual failure manifesting themselves."

W. R. P.

Serumtherapy in Ophthalmology.

(Continued.)

Axenfeld, Prof. (*Ophth. Review*, February, 1909). Much greater theoretical and practical difficulties are offered by *bactericidal serum-therapy* which is directed against those bacteria which do not produce free toxin capable of being bound by an antitoxin-serum in a simple chemical way.

Roemer's and Merck's pneumococcus-serum in the treatment of ulcus serpens possesses curative properties; but does not act so certainly that it can take the place of other treatment. Its use is suggested in benign cases and as an adjunct in those cases in which other treatment is incapable of arresting destruction of the cornea.

The action of *streptococcal-serum* or vaccine as similar to that of pneumococcus, i. e., a supplementary action to other treatment.

Of staphylococcus serum-therapy very little is known up to the present time.

If *prophylactic serum-therapy* is indicated in *cases of operation of the eye ball* when there is special danger of infection it will be best to produce active immunization with vaccine from bacteria which have been cultivated from the eye of the patient. This is relatively easy for some organisms as staphylococci; but difficulty may be experienced in obtaining an effective vaccine with pneumococci as on cultivation they often display but a slight degree of virulence.

To obtain rapid absorption muscular injection is the best. Subconjunctival injection of vaccine is irrational as it may cause more local irritation; and to produce anti-bodies the vaccine must first reach the spleen or marrow.

Metastatic gonorrheal eye disease might perhaps be treated with a vaccine, but the influence in gonorrheal conjunctivitis is questionable.

The suggestion of Roemer of hastening the solution and absorption of vitreous hemorrhages by injecting *haemolytic-serum* into that body has not led to any practical results.

Ophthalmologists will need a special series of researches to decide the question of dosage in treatment of cases of eye tuberculosis.

In sympathetic ophthalmia the prospects of serum-therapy are not very good as it is very probable that the germs producing the condition have but little if any influence on organs producing anti-bodies.

For diplobacillary infection it is not worth while to attempt vaccine-therapy as we possess such a reliable remedy in zinc.

(*To be concluded.*) N. M. B.

Mr. Percival Pott and the Treatment of Lacrimal Obstruction.

Fergus, A. Freeland (*Ophth. Rev.*, April. 1909). The author quotes from a paper written by Percival Pott in 1758 entitled "Observations of that disorder of the corner of the eye commonly called fistula lachrymalis," showing conclusively Mr. Pott had at his command the essentials of the most modern treatment of lachrymal disease.

Fergus decries the method of slitting the canaliculus, except in those cases in which there is such a degree of ectropion that the punctum is no longer in contact with the conjunctiva of the eye ball.

Regarding the treatment by probing, the author thinks such a procedure involves a radical mistake as regards the pathology of the condition. The original entity being in the large majority of cases not an obstruction or stricture but the presence of a pyogenic membrane.

"The inflammation to which this gives rise may no doubt in time cause a stricture. but so long as the treatment is devoted to this stricture, which is purely secondary and not primary, so long will results be disappointing."

Probing is only of use in so far as it secures drainage and for this limited purpose there are no better probes on the market than those of Bowman. These can be introduced with the least risk, an operation by no means devoid of danger and one which the author considers positively dangerous in using the large probes of Theobold.

As we are not acquainted with any drug which will render the tissue of the sac antiseptic by destroying micro-organisms, thorough irrigation of the sac by means of a syringe and normal saline solution has been found as satisfactory as anything else.

For the above reasons it has been the practice of Fergus in chronic dacryo-cystitis to begin the treatment by the passing of Bowman's probes and the thorough irrigation of the sac with normal saline. Occasionally that succeeds in putting the matter right; if it does not, then the only other rational treatment is to remove the lachrymal sac altogether, an operation which in the main is tolerably easily executed. As a rule the removal of the sac gives the patient perfect comfort. There is not, as might be supposed, an undue amount of lachrymation; the patient only very rarely suffers from watering of the eye.

A considerable number of sacs have now been removed either by the author of this paper or at his instigation by his colleague, Dr. McMillan, and only on one occasion has there been a troublesome amount of watering, which was easily put right by the removal of the lachrymal gland on the same side.

Occasionally and most disappointingly the removal of the sac does not cause purulent discharge to cease; this is particularly true when a portion of the sac has inadvertently been left in situ. Nor is a recurrence of the suppuration uncommon when the disease is of tuberculous origin. The tubercular invasion is apt to extend beyond the sac to the surrounding tissues, and even the most careful and proper removal of the sac does not free the patient from the malady. Apart from this group of cases, however, the results are satisfactory alike to the surgeon and to his patient. N. M. B.

On Some Abnormalities of Ocular Muscles.

Jackson, J. Hughling, and Paton, Leslie (*Lancet,* March 27, 1909). The authors elaborate upon the subject with particular reference to erroneous projection in cases of paralysis of muscles of the eyeball, especally in cases of paralysis of an external rectus.

The question of centroperipheral or peripherocentral nerve currents is discussed. Experimentally produced simulation of paralyses of various muscles induced by prisms are commented upon with deduction in favor of the periphero-central current theory. Several cases are reported. The article must be read in its entirety to be appreciated. N. M. B.

The Diaphragm Test for Binocular Vision.

Harman, N. Bishop (*Ophth. Rev.,* April, 1909). This test is the reverse of Javal's well-known "Barreading" test. Instead of a bar which the patient's eyes must negotiate, there is a screen with a single hole in it; through this hole the patient can look with both eyes, quite naturally, and without suspecting the manner in which his vision is being dissected.

The instrument is a length of wood like a flat ruler 44 c.m. long is fitted with a rack at one end to receive the test cards, and a screen measuring 9x6 c.m. fixed at 11c.m. from the rack. In this screen, or diaphragm, a hole is cut; it is either square or round and measures 1.7 cm. square or diameter. A movable pin is fixed to the diaphragm so that it can be projected into the hole as a point of fixation in certain experiments. A handle is fixed beneath the base board.

In use the patient takes hold of the handle with both hands and places the free end of the rule (this is washable) against the upper lip just beneath the nose. The surgeon stands facing his patient and holds the other end of the instrument to keep it steady. When the instrument is in position the patient is asked to look either through the hole, or at the pointer projecting into it, according to the test desired, and to tell what he sees through the hole.

There are three sorts: 1. Printed matter, of any size from diamond in set paragraphs to canon in paired capitals. 2. Black or colored squares variously disposed. 3. Pictures for children. A number of test cards are issued with the instrument, but the surgeon can make and vary them indefinitely.

The screen with the square hole is most generally useful; for the reading test particularly, and when we wish to demonstrate the presence of binocular vision where it is denied. When the patient looks clear through the hole at the test the margins of the hole are seen double, the square becomes an oblong; this change escapes remark save by the most observant. On the other hand when it is desired to demonstrate weakness of binocular vision or in fusion experiments the round hole is the better, as reduplication of the circle and overlapping of the two images is very noticeable.

THE USAGES OF THE DIAPHRAGM TEST.

The test is of value for the following purposes:

1. To determine the equality of visual acuity in the two eyes.

2. To determine the presence, the absence, or a defect of binocular vision.

3. To exercise the vision in squinting eyes.

4. To detect malingerers feigning monocular blindness.

5. To determine certain physiological phenomena connected with the perception and suppression of images.

N. M. B.

To See the Back of the Eye.

(An ingenious instrument for the examination of the back of the human eye.)

Hertzell, Carl (*The Graphic,* London, March 6, 1909). While it must be considered as an adjunct to the familiar ophthalmoscope, it possesses, nevertheless, separate and distinctive value, and has already served many useful purposes. Essentially the "Ophthalmo-Diaphanoscope," as it is called, consists of a portable cylindrical electric lamp of about 80 *candle power* with self-contained tube, provided for water cooling; at the lower end is an electric lead or wire, which is joined up to an electric-lighting supply box when the apparatus is in use and current required. The patient places the instrument in the mouth, as far back as possible and against the upper wall of the buccal cavity. The light is then turned on. Viewing the pupil of the eye from the front, the highly illuminated retina is brought before the ophthalmic surgeon, who is able thus to diagnose the appearance of the membranes and pathological condition of the back of the eye. A black mask is worn by the subject in order that the impression given by the central field of illumination may not be impaired.

N. M. B.

Common Mistakes in Ophthalmic Practice.

Roper, Arthur C. (*British Medical Journal,* March 20, 1909, p. 706). This unusual but very practical article recounts in detail some of the most prevalent errors the author has seen committed, beginning with the prescription of minus lenses in low degrees of hypermetropia with cramp of the ciliary muscle. In the treatment of squint, it is a mistake to operate during the early stages. Glasses should correct every case in the early stages. Slight errors of refraction more frequently cause headache than the higher degrees. Foreign bodies under the lids, especially in the cul-de-sacs are easily overlooked and it is good practice to run a swab through the upper folds if there is any possibility of an oversight. Certain "Foreign Body" cases may simulate neuralgia. Hypopyon-ulcer is often treated with insufficient care and promptness. Every case is serious no matter how small the ulcer. Low grade plastic irido-cyclitis is often overlooked. Pain and redness may be slight and the visual disturbances are the only symptoms which attract the patient's attention, while the cases are always intractable and at the time serious. He mentions the use of atropine in mistaking glaucoma for iritis. The chief danger is in cases of chronic glaucoma. E. S. T.

Report on the Local Anaesthetics Recommended as Substitutes for Cocaine.

Le Brocq, C. N. (*British Medical Journal*, March 27, 1909, p. 783). (*From the Pharmacological Laboratory, Cambridge.*) The substances investigated were: Stovain, Novocain, Tropacocaine, Beta-eucaine, Alypin, Beta-eucaine lactate, Nirvanine, Holocaine hydrochloride, Acoine, Orthoform (new), Anaesthesine. The points to which special attention was paid are:

1. A lower degree of toxicity than cocaine in proportion to its local anaesthetic power.
2. Solubility and stability.
3. Absence of any signs of irritation.
4. Compatibility with adrenalin.
5. Rapid penetration of mucous membranes.

Acoine, holocaine hydrochloride, anaesthesine, orthoform, and beta-eucaine, are all more or less insoluble and cannot be used for subcutaneous injections. Cocaine, stovaine, novocaine, tropacocaine, beta-eucaine lactate, alypin, and nirvanine, are freely soluble and solutions are stable. A 2% solution of any one of these will keep for a short time without deterioration.

Cocaine cannot be boiled. Stovaine, novocaine, tropacocaine, alypin, beta-eucaine lactate, and nirvanine, can be sterilized at 115° C., undergo no change, and are as active as before.

Locally, stovaine is more powerful than cocaine; novocaine, tropacocaine, alypin, and beta-eucaine lactate, are about equal; nirvanine is inferior.

Tables of toxicity (by injection in rabbits, etc.):

Alypin	1.25
Cocaine	1.00
Nirvanine	.714
Stovaine	.625
Tropacocaine	.50
Novocaine	.490
Beta-eucaine lactate	.414

Irritation to tissues (injection in abdominal wall of rabbits):
Cocaine, slight swelling and hyperaemia.
Stovaine, intense hyperaemia, swelling and sloughing.
Beta-eucaine lactate, swelling and sloughing.
Tropacocaine, swelling and sloughing.
Novocaine, no swelling and no hyperaemia.
All are compatible with adrenalin.

Taking all questions into consideration, novocaine is most satisfactory for general use. Its anaesthetic action is equal to that of cocaine and its toxicity and general destructive power on tissues are very much less. E. S. T.

Cases of Retrobulbar Optic Neuritis.

STIRLING, ALEXANDER W. (*Ophthalmoscope*. Edinburg, March, 1909). The subject is introduced by a quotation from Sir Victor Horsley, urging the early operative treatment of optic neuritis accompanying intra-canial new-growth, or inflammation. The operation advised is opening the space in the temporal or subtentorial region, which is practically unattended by risk and of immediate value in saving sight. The author reports a series of nine cases selected from his private practice, which belonged to the class designated as retro-bulbar optic neuritis, omitting those cases due to intra-cranial lesions, trauma, Leber's hereditary atrophy and the so-called toxic amblyopias.

Nearly all the cases reported show early failure of vision, pain in the eyes or head or pain on movement of eyes. The visual fields show invariably contraction and in the majority, a central scotoma of varying degree both for white and for colors. It was noticed that usually the scotomata disappeared before the general field recovered. Several cases showed a rather interesting phenomenon in the reaction to light, the pupil showing a secondary wavering and dilatation, while the light was still thrown into the eye; in one case it was present after contraction to convergence. Pupillary reaction to light, but not to accommodation, was present in one case. In several instances swelling of the papilla and enlargement of the vessels was observed. One patient showed paralysis of the external rectus, accompanied by pain and optic neuritis, in which this differed from a group of cases previously reported not showing optic neuritis.

All of the cases recovered useful vision, 6/5 to 6/9, except one case, which is still under treatment, and whose vision has improved from fingers at three feet to 6/36.

The treatment employed consisted in various medication, such as arsenic, pilocàrpin, potossium iodide, salicylate of soda, mercury, strychnine, Dover's powders, and in one case removal of adenoids was followed by recovery. Although retro-bulbar neuritis is said to be very uncommon in persons as young as 14 or even 16 years of age, the majority of the cases were under 20 years of age, the youngest aged 7 years.

Six cases suggestive of a quondam retro-ocular neuritis not much improved by treatment are also briefly reported.

The toxic amblyopias, especially alcohol, closely resemble the retro-bulbar variety. Alcohol, the author has found to "aid and abet tobacco" in causing amblyopia. In conclusion the recognized causes of retro-ocular neuritis are briefly stated, including orbital cellulitis and periostitis, perhaps from the teeth or ears, sphenoidal disease, "colds," rheumatism, gout, syphilis, tuberculosis, insular sclerosis, and perhaps most important of all, auto-intoxication, and such fevers as malaria and typhoid. W. R. P.

A Case of Recurrent Retinal Hemorrhage in a Boy of 18 Years, the Result of (?) Malignant Endocarditis.

Grimsdale, Harold B. (*Ophthalmoscope*, March, 1909). The author reports a very interesting case of recurring retinal hemorrhages in a boy 14 years of age, with progressive failure of vision. The cause was unknown until death, occurring later from malignant endocarditis, the possibility of the same disease causing the retinal condition was suspected.

The first change noticed in the fundus was a patch of edema in O.S. beneath the disk and spreading towards the macula, sharply defined and limited by a dusky red patch of deep hemorrhage. The right eye showed no change except a slight hyperemia of the disk. The patient had consulted the author four years previous and again one year before, when no change had been noted except a myopia which had increased from 1 D to 2.75 D and when corrected gave 6/5 vision. The edema extended during the next two weeks; the hemorrhage increased and the vision fell to 6/90. Mercurial inunctions were ordered, even though the history of syphilis was negative, in hopes of bringing about absorption of the inflammatory products. The patch of edema became organized, suggesting in appearance a mass of connective tissue. The right eye also soon showed edema and a small hemorrhage.

He was examined by Sir A. E. Wright, who found the coagulation time of the blood lengthened to 2 min. 30 sec. against a normal time of 1 min. 45 sec. and prescribed calcium lactate, twenty grains three times a week.

At first some improvement was observed, but only temporarily, for a week later, afer slight exercise, fresh hemorrhages made their appearance in both eyes. In spite of increased treatment and absolute quiet, the hemorrhages were constantly recurring, always small in size and easily absorbed. The following month an indefinite gray halo appeared about the right optic disk, also fresh deep hemorrhages and more striation. The hemorrhages in the left eye had all absorbed and now showed atrophy of the choroid and patches suggestive of retinal degeneration. The right eye became rapidly worse, a scotoma spreading from the blind spot covering the center, and vision decreased correspondingly. A triangular patch was now observable, extending from the optic disk to the macula. When last examined there had been some improvement and the ophthalmoscope picture looked less threatening, the edema had disappeared, but superficial atrophy of the retina and chorio-papillaris was visible over the macular region. The vision improved to 6/12 but the letters were seen only momentarily as if through holes in a screen.

A heart lesion had been discovered by Dr. Cyril Ogle and thought to be a mitral stenosis. A transient albuminuria, probably due to the cardiac condition, was present at times. The prolonged coagulation time of the blood was strongly in favor of a general blood disease, but the family history was negative and syphilis was not probable.

The patient died of malignant endocarditis two years later. The eyes remained unchanged during the latter part of the illness. W. R. P.

Persistent Asthenopia.

Risley, Samuel D. (*The Ophthalmoscope,* March, 1909). The author considers the class of patients who suffer from asthenopia which may persist through many years in spite of careful advice and treatment, in whom it is not easy to determine the essential etiological factors.

He cites the case of a boy, aged ten years, who suffered from undue sensibility to light, and blurred vision after prolonged near work. Vision right eye, 6/12 — 1/2; left eye, 6/7 — 1/2. Fundus in both eyes drak red and fluffy. He had hyperopic astigmatism. Refraction under sulphate of hyoscyamin gave the following:

O. D. s + 2.00 — c + .50 ax. 105° — 6/5.
O. S. s + 2.00 — c + .75 ax. 75° — 6/5.

A slight deduction was made in the spherical and glasses given for constant wear.

Four months later all symptoms had disappeared. Three years later the eyes were healthy and comfortable.

At the age of sixteen he returned complaining of a return of old symptoms. In the meantime he had abandoned his glasses. The old fundus changes had returned, and in addition there was inflammatory change in the chorioid along the temporal border of each nerve. He rejected all glasses. Vision in each eye was 6/6. The anterior long, perforating ciliary vessels were full and dark, and the sclera a bluish white in the anterior segment. Under a cycloplegic his refractive error was + .75 cyl. ax. 90° in each eye, v. 6/5, the 2 D. of hyperopia had disappeared. The vision remained normal, but the eyes were weak—unduly sensitive to light, would not bear work, and remained a source of constant annoyance and trouble. The fundus oculi remained fluffy, the papillae congested, and the veins full and dark red. He was finally compelled to abandon his college work. He enjoyed comfort if no attempt was made to use his eyes. After three years a gradual improvement was noted and he returned to college, when the old symptoms returned, but in a mild degree.

Remarks.—It is interesting to inquire into the cause of this asthenopia, extending from his 16th to his 21st year of age. The most careful and elaborate study failed to discover any general disorder to account for the local impairment of functioning power.

The crux of the matter seems to rest in the distention of the sclera in the anterior segment of the globe, as indicated by the increasing refraction of the eye. In the interval in which he had abandoned the use of his glasses, between his 14th and 16th years, he had lost 2 D. of hypermetropia. The sclera in the ciliary region had become thin and bluish-white, while the long, anterior ciliary arteries and their accompanying veins which perforate the globe at this point, were large and full, suggesting ciliary hyperemia and a relative increase of intraocular tension.

In addition to these indications of disease in the ciliary segment of the globe, attention is called to the crescent of choroiditis embracing the temporal margin of the optic nerves. Without treatment and rest from work, both eyes would doubtless have passed through the "turnstile of astigmatism" into myopic refraction, with the chorioidal atrophies at the posterior pole, or, possibly, the posterior staphyloma, which characterizes the myopic ball.

In point of fact, in this patient the distention of the ball, which neutralized two diopters of hypermetropia, was affected by a stretching of the sclera in the anterior segment of the globe.

The eyes remained healthy as long as the correcting glasses were worn, but their neglect during the critical years of his adolescence was doubtless an important factor in causing the return of the irritation and turgescence of the uvea. The tension of the ball was raised, its nutrition impaired, and the sclera stretched, thus increasing the diameters of the globe. Any effort at near-work was therefore painful and led to further injury.
W. R. P.

A Piece of Steel Imbedded in the Optic Nerve.

Butler, T. Harrison (*Ophthalmoscope*, Vol. 7, No. 5). The author reports a patient, male, aged 23 years, mechanic, who, while attending a planing machine, was struck in the eye with a piece of steel. There was a rupture of the sclerotic, five millimeters long, at the lower aspect of the left eye extending slightly into the cornea; a rent in the anterior capsule, lens cataractous, no fundus reflex. The globe was moderately injected, but there was no sign of a foreign body in the anterior part of the eye. Vision, no light perception.

Iridectomy was done, the eye irrigated with 1 to 5,000 bichloride of mercury solution, and the hand magnet applied close to the eye, but caused no pain. Three days later the eye was quiet and showed no sign of infection. A skiagram made on the fourth day showed a clear shadow of a foreign body, apparently in the optic nerve itself. On the fifth day the lens was extracted, and the nose-piece of Snellen magnet passed along the path of entrance of the foreign body, but failed to remove it. Three days later, a Haab giant magnet was applied without result. Five days later the eye became injected and the iris discolored, but there was no punctate keratitis, or exudate in the pupil; the vessels were engorged. enucleation was advised. The eye was examined after enucleation, to find deeply imbedded in the optic nerve a piece of steel that could not be removed with forceps. The vitreous was full of blood and disorganized. The piece of steel was 6 mm. long, 3½ mm. broad, and weighed 0.13 grammes.

The chief interest in this case lies in the fact that the fragment was deeply imbedded in the nerve, and in the clear way the final skiagram showed the globe of the eye and the optic nerve. W. R. P.

Labyrinthine Nystagmus.

Ormond, Arthur W. (*The Ophthalmoscope,* April, 1909). After referring to the work done by Breuer and Barany on the subject of nystagmus, the author analyzes particularly the work done by Sidney Scott.

Labyrinthine nystagmus, i. e., nystagmus produced by stimulation of the labyrinth, may be divided into three main types, namely, horizontal, vertical and rotary; the movement consists of a slow, followed by a rapid, oscillation; it is most marked when the vision is fixed on the limits of the binocular fields of vision.

Mr. Scott tabulates the results of his research upon the movement of the eyes produced by thermal and rotation stimuli, i. e., by irrigating the ear with hot (110°-118° F.) and cold (80°-65°) water, and by rotating the patient on a revolving table. The different conditions are classified under six tables and are given in full.

Table I.—Rotatory (counter-clockwise) nystagmus observable during attentive deviation and fixation of the eyes to the right.

By thermal methods.

Cold water irrigation.	Left ear.	Head erect.
Hot water irrigation.	Right ear.	Head erect.
Hot water irrigation.	Left ear.	Head inverted.
Cold water irrigation.	Right ear.	Head inverted.

By rotation around a vertical axis.

Rotation counter-clockwise.	Face directed downwards.
Rotation clockwise.	Face directed upwards.

Table II.—Rotatory (clockwise) nystagmus observable during attentive deviation and fixation of the eyes to the left.

By thermal methods.

Cold water irrigation.	Right ear.	Head erect.
Hot water irrigation.	Left ear.	Head erect.
Hot water irrigation.	Right ear.	Head inverted.
Cold water irrigation.	Left ear.	Head inverted.

By rotation around a vertical axis.

Rotation clockwise.	Face directed downwards.
Rotation counter-clockwise.	Face directed upwards.

Table III.—Horizontal nystagmus observable during attentive deviation and fixation of the eyes to the right.

By thermal methods.

Cold water irrigation.	Right ear.	Face downwards.
Hot water irrigation.	Left ear.	Face downwards.
Hot water irrigation.	Right ear.	Face upwards.
Cold water irrigation.	Left ear.	Face upwards.

By rotation around a vertical axis.

Rotation counter-clockwise.	Head erect.
Rotation clockwise.	Head inverted.

Table IV.—Horizontal nystagmus observable during attentive deviation and fixation of the eyes to the left.

By thermal methods.

Cold water irrigation.	Left ear.	Face downwards.
Hot water irrigation.	Right ear.	Face downwards.
Hot water irrigation.	Left ear.	Face upwards.
Cold water irrigation.	Right ear.	Face upwards.

By rotation around a vertical axis.

Rotation clockwise.	Head erect.
Rotation counter-clockwise.	Head inverted.

Table V.—Vertical nystagmus observable during attentive deviation and fixation of the eyes upwards (in relation to the orbit).

By rotation methods.

Rotation counter-clockwise.	Right side of head downwards.
Rotation clockwise.	Left side of head downwards.

Table VI.—Vertical nystagmus observable during attentive deviation and fixation of the eyes downwards.

Rotation clockwise.	Right side of head downwards.
Rotation counter-clockwise.	Left side of head downwards.

Mr. Scott thus claims to be able to produce experimentally any of the commoner forms of labyrinthine nystagmus, and with known conditions to predict the kind of nystagmus which will result.

Mr. Scott has drawn the following inferences: "The inferences which I have drawn from a study of these data have led me to regard the ampullary apparatus as the receptive organ of stimuli set up by deflection of the fibrillae; that under ordinary conditions the deflection is produced by movements of the head; that the force causing the deflection is due to inertia of the fine ends of the fibrillae; that the impulses are conveyed by the ampullary nerves to the brain; that these different impulses affect among other parts the ocular-motor apparatus and cause a movement of the eyeball; that this movement of the eyeball aids attentive fixation of the visual axes upon an object during movements of the head; that the direction of movement of the eyeball depends upon the source of the stimulus: when the stimulus originates in the ampulla of the external semicircular canal, the direction of the ocular movement is horizontal; when the stimulus arises in the ampulla of the superior canal, the movement of the eyeball is rotatory; and when the stimulus originates in the inferior ampulla of the posterior semi-circular canal, the movement of the eyeball is vertical."

"Moreover, when stimuli arise simultaneously in the external and superior semi-circular ampullae the resultant eye-movement is composed of horizontal and rotatory elements; that when the stimuli originate simultaneously in the superior and inferior ampullae, the resultant movement is composed of rotatory and vertical elements; and that when the stimuli arise simultaneously in the external and inferior ampullae, the resultant eye-movement is oblique. And similarly when stimuli originate in all three canals simultaneously, the resultant eye-movement is composed of horizontal, vertical and rotatory elements. The direction of eye-movement in any particular plane depends upon the direction of deflection of the fibrillae in the ampulla in which the stimulus originates. The rapidity and extent of movement of the eyeball varies directly with the intensity and duration of the stimulus. The intensity and duration of the stimulus will vary directly with the rapidity and period of movement of the head."

The observation that the eyes are enabled to follow a rapidly moving object, held at a distance of 18 inches from the eyes, in a perfectly smooth and regular manner so long as the head can be moved at the same time as the eyes; while if the head is held motionless, the eyes alone following the rapidly moving object held at 18 inches from the face, the motion becomes jerky, is given as a proof that the labyrinthine reflexes aid us in obtaining a perfectly smooth and even ocular movement.

Mr. Scott attributes the spontaneous nystagmus which follows complete destruction of the labyrinth on one side to the result of impaction waves set up by the carotid pulsation. He also suggests the possibility of the nystagmus being the cause of the amblyopia rather than the reverse. But it is not suggested that all cases of nystagmus are to be taken as labyrinthine in origin. Occupational nystagmus could in all reason be associated with currents set up in the semi-circular canals incident to the occupation.

In conclusion, he suggests "in all cases where the nystagmus present exhibits more or less the characteristics of labyrinthine nystagmus, that the examination of the ears should not be neglected: it may be assumed that if no alteration in an existing nystagmus occurs on stimulating the vestibular apparatus that there is an absence of function, on the other hand, when there is unilateral stimulation the spontaneous nystagmus will show a weakening or strengthening according to the position of the eyes." W. R. P.

ABSTRACTS FROM GERMAN OPHTHALMIC LITERATURE.

BY

Edward A. Shumway, M. D.,

PHILADELPHIA.

A. C. Sautter, M. D.,

PHILADELPHIA.

Frederick Krauss, M. D.,

PHILADELPHIA.

AND

Meyer Wiener, M. D.,

ST. LOUIS.

Casuistic Contribution to Double Vision Following Injuries.

Elze-Zwickau (*Woch. f. Ther. u. Hyg. d. Auges,* October 1, 1908). After acknowledging the periosteal blood clot in the region of the trochlear, and faulty blending of retinal pictures due to toxic influences as possible causes producing diplopia, Elze reports two cases of injury to the internal ear; one due to a fall on the occiput, the other due to an explosion close to the ear. In both cases characteristic changes in the labyrinth were present, double vision, and contraction of the color fields. He recalls another case of injury to the occiput where there appeared paralysis of the arm and leg, impaired vision, and diplopia. No muscle or set of muscles could be isolated as the cause of the double vision, which was present with the eyes directed in any manner, particularly in the horizontal line; and concludes that it must have been due to a cranial fracture causing disturbance in the center (?) for the association of binocular movement. M. W.

Ophthalmo-Reaction.

Ruppel, W. G. (*Woch. f. Ther. u. Hyg. d. Auges,* October 8th, 1908). Ruppel gives a brief review of the use of the Calmette ophthalmo- reaction and blames the discontinuance of the method to the use of the 1% solution recommended by Calmette, which he thinks too strong and accounts for the numerous disastrous results. Especially does he think Dr. Polland's warning as to the dangers due to his using the original strength prescribed by Calmette. He believes a 0.1% solution to be sufficient, which he claims has been clearly demonstrated in the Institute for Experimental Therapeutics by Prof. Ehrlich. The preparation in this strength is harmless and where this has not been the case he ascribes the bad results to faulty quality of the preparation. M. W.

Irideremia Congenita.

Gutfreund (*Wien. klin. Woch.,* 1908, 86; abstract in *Woch. f. Ther. u. Hyg. d. Auges,* October, 1908). Gutfreund reports a case of father and daughter with absence of the iris. In the father there were numerous vascular opacities of both corneae with a large central opacity left, about the size of the lens. He gave no history of inflammation of the eyes at any time. Left eye was entirely devoid of iris; right, above and outward, there was a small remnant. The eleven-months-old child had horizontal nystagmus. Both corneae clear. Entire absence of the iris in the right eye. To the outer side of the left eye a fine web of hazy outline was observed. M. W.

Sophol.

Krause (*Münch. med. Woch.,* 1908, 39; abs. in *Woch. f. Ther. u. Hyg. d. Auges,* October 1, 1908) spoke before the Nüremburg Medical Society, of sophol, which he has been using for the past year or more, and for the last six months exclusively as a substitute for protargol and silver nitrate in prophylaxis of ophthalmia neonatorum, and in all cases where silver salts are used, 5% to 10% solutions were used. He agrees with von Herff that the preparation is much less iritating and less painful than silver nitrate or even protargol. No bad results were observed, although he believes in being careful, to avoid argyrosis. Sophol should be kept cool and should be freshly made. M. W.

Vesicants in Ophthalmology.

Weitlaner, Franz (*Woch. f. Ther. u. Hyg. d. Auges,* October 15, 1908). Weitlaner advocates the use of Emplastrum cantharidum perpetuum in severe cases of phlyctenular conjunctivitis and keratitis. He spreads it on a piece of linen about the size of half a dollar and places it just in front of the ear and under the border of the hair of the scalp. It is left in position from twenty-four hours to four or five days when it is removed and zinc paste applied. The plaster blisters painlessly, producing, with only a slight drawing sensation, a serous blister in about five hours, which usually bursts of itself. Sometimes on account of a discoloration left by the blister and slowness to disappear, the paste is applied behind the ear or on the temple after first shaving the hair. He claims remarkable results from the plaster in these cases; but strange to say, it is absolutely inert in inflammations of the cornea or conjunctiva of character other than scrofulous. The other usual treatments should be used. M. W.

Palliative Trephining for Choked Disk

Von Hippel (*Muench. med. Woch.,* 1908, 37; abs. in *Woch. f. Ther. u. Hyg. d. Auges,* October 22, 1908). Von Hippel was led to a careful investigation into the literature of trephining for choked disk by the loss of a case from infection following the decompression operation. He comes to the conclusion that in the light of our present knowledge, if the early decompression operation be adopted in order to prevent blindness, it would be an advance in progress. The danger from the operation can be diminished by using chloroform instead of ether: performing the operation in two steps; first removing the bone, laying bare the dura: then, if necessary, a few days later to open the dura. An ophthalmoscopic examination to be made between, to determine the necessity for the latter procedure. Even in the choked disk due to gummata he advises the operation, as the action of iodide of potassium is often not sufficiently quick to prevent blindness. M. W.

The Problem of Magnified Heavenly Bodies on the Horizon.

Haenel, H. (*Woch. f. Ther. u. Hyg. d. Auges,* October 22, 1908). Haenel takes up the question of apparent enlargement of the moon when seen on horizon, and refers to the various theories of Bacon, Kepler, Cardanus, Huygens, Helmholz and others which he dismisses, and concludes that the condition is mental, due to our comparing it with moving and other objects, and getting a sense of perspective when it is on the horizon, thus making it appear nearer (and therefore larger) than when we look up into the clear sky. M. W.

Ophthalmic Crisis in Tabes.

Knauer (*Muench. med. Woch.*, 1908, 37; abs. in *Woch. f. Ther. u. Hyg. d. Auges*, October 29, 1908). Reviewing the literature, Knauer found only three cases of this condition reported: those of Pel, Peterman, and Hascove. He describes the case of a young woman 39 years of age with undoubted tabes, who was suddenly taken with a severe burning pain in the right eye. Conjunctiva became swollen and red; there was profuse tearing and photophobia. Pupils very small. Periorbital subcutaneous tissue swollen. At intervals of about 14 minutes a terrific boring pain in the right eyeball, lasting about five minutes would appear and then suddenly go away. Vision was 6/6; fields normal; cultures from conjunctival sac gave only xerosis bacilli. On the afternoon of the third day the attacks gradually disappeared, and with them the swelling. Six days later the same performance was repeated in the left eye. This lasted five days when the eye had returned again to its normal condition. No external cause for the affection could be unearthed: Knauer seemed to think that we should look for the cause in the medulla. M. W.

Senile Cataract—When to Operate.

Schultz-Zehden (*Zeitschr. f. Arzt. Fortbildung*, November 15, 1908; abs. in *Woch. f. Ther. u. Hyg. d. Auges*, November 19, 1908). Schultz comes to the same conclusion as Hess (Graefe-Saemisch), that senile cataract should not only be operated upon when mature but at any time that the opacity has impaired the vision sufficiently so as to interfere with the patient's wellbeing. He believes the patient takes the same chances with any form of cataract operation, whether it be a secondary operation or simple extraction. M. W.

Bactericidal Properties of Tears.

LINDAHL (*Medico-Chir. Instit. zu Stockholm,* 1908, h. 9; abs. *Woch. f. Ther. u. Hyg. d. Auges,* November 19, 1908). Lindahl made a number of experiments to ascertain the bactericidal property of the tears on the pneumococcus and streptococcus. The result seemed to have shown a doubtful effect on the pneumococcus. In all probability the varying results were due to peculiarities of the various cultures, or perhaps also, to varying antiseptic quality of the tears. The experiments with streptococci gave invariably anti-bactericidal effects as compared to the previously warmed distilled water used as a control. The principal results of the foregoing seems to be that the bacteria-killing power of the tears is in the nature of an enzyme. Most likely the lacrimal gland and the conjunctiva form bactericidal substances which pass into the tears.

M. W.

Greenish Stained Cornea in Multiple Sclerosis.

SALUS, R. (*Woch. f. Ther. u. Hyg. d. Auges,* December 3, 1908). Salus describes the greenish tint of the cornea he has observed in multiple sclerosis and tries to differentiate this tint from the brown discoloration due to aniline dyes. The stain from aniline dye is sepia brown, lies in the region of the opening of the lids, and extends from the superficial down into the deep layers of the cornea. The stain described by the author varies from brown to green, is circular in form, located at the limbus and lies in the deepest layers. Also the aniline stain described by Senn is hazy and has a marble like tone. Also the epithelium over the stain shows tiny vesicular like elevations filled with a transparent fluid, and the bulbar conjunctiva in the lid aperture is colored yellow-brown in a triangular area. He quotes Axenfeld referring to this greenish brown discoloration in multiple sclerosis. M. W.

The "Hanging" Mellinger Innerpole Magnet.

WIRTZ (*Woch. f. Ther. u. Hyg. d. Auges,* December 10, 1908). Wirtz suspends the innerpole magnet of Mellinger by means of a chain pulley, which he believes to be a great advantage over the original mounting. He believes the innerpole superior to the Haab and similar giant magnets in that greater power is obtained with less current, and the field of operation is left free. Formerly one of its disadvantages was that the patient naturally moved away from the field and especially so, when the assistant forced open the lids. With the magnet in the suspended position, the patient is placed in the reclining position and the magnet lowered so that the ring passes over the face until its collar actually rests upon the patient's neck. The opposite side may rest on a pillow. This gives the operator a clear field without allowing the patient to jerk backward. M. W.

Bacteriology of the Conjunctiva.

Brons, C. (*Centralbl. f. Bacteriologie, Parasitenkunde, und Infectionskrankheiten*, 1908; abs. in *Woch. f. Ther. u. Hyg. d. Auges*, December 17, 1908). Brons reports some further observations on the Gram-negative diplococci of the conjunctiva and reports particularly a case of Weichselbaum meningococcus. With Axenfeld, he claims it is impossible to differentiate on a slide preparation the three diplococci of gonorrhoea, meningitis, and catarrhal conjunctivitis. While it is true that the latter does not ordinarily invade the cells, still in a severe form of conjunctivitis this is also true. The only way to differentiate then, is by culture. He advises, however, to treat the case in the meanwhile as though it were gonorrhoea, since it requires 24 hours to learn the nature of the culture.

M. W.

Ethylmorphiniodide—A New Dionin Preparation.

Sylla, Bruno (*Woch. f. Ther. u. Hyg. d. Auges,* January 7, 1909). While using dionin in powder form followed by the dusting of iodoform in a case of ulcer of the cornea, Sylla found that there was a great deal more reaction and less pain than when using dionin alone. On reversing the order of application and finding the same result, also that the scar tissue seemed to melt away much quicker than usual, he came to the conclusion that there must be some chemical union of the two, the iodine taking the place of the chlorine in the ethylmorphinchlorid (dionin). Further experiments, as well as assurance from E. Merck of Darmstadt, who sent him the preparation of ethylmorphiniodide confirmed this conclusion. This fact was most welcome to Sylla since to his mind it was the chlorine in the preparation which caused the irritation. Tests were made on patients on whom dionin had been used who complained of considerable irritation therefrom but experienced no pain whatsoever from the iodine preparation. Also controls were used, dusting the dionin in one eye and ethylmorphiniodide in the other; the usual irritation being experienced from the former, while none was felt from the latter. Also he found the same amount of the latter powder produced a greater lymphogogic affect. And furthermore, where dionin had been used for a considerable time and had lost its effectiveness, a change to the ethylmorphiniodide produced a marked redness and swelling. Besides, he believes the iodine itself to have a beneficial effect, penetrating into the tissues with the help of the lymphogogic effect of the ethylmorphine, and quotes Lewin's book on "Nebenwirkungen der Arzneimittel" for corroboration. He used the preparation in a case of detachment of the retina in a myope of 25 diopters on whom dionin had been of no avail. After the fourth application the retina had completely reattached. He realizes that this may be a coincidence, but believes the drug deserves a thorough trial. In summing up, ethylmorphiniodide is less irritating, more effective and the effect endures for greater length of time than dionin. It is less soluble, being dissolved with difficulty up to a 4 per cent. warm aqueous solution. However, since the author only uses the powder direct, this is not of importance. M. W.

Another Case of Ocular Disease Due to An Artificial Fertilizer.

Hessberg, R., Munich (*Muench. med. Woch.*, August 18, 1908). While the 62-year-old patient was spreading hyperphosphate fertilizer, the wind blew some into his eye. There was little reaction until two days later when the right became acutely inflamed. This was followed by lid swelling and abscess formation, proptosis, corneal ulceration and perforation and finally panophthalmitis. The abscess in the upper lid was incised, others in the lower lid and one penetrating 2 cm. into the orbit ruptured spontaneously. Bacteriological examination of the purulent discharge revealed the staphylococcus albus. Phthisis bulbi ultimately resulted, and the abscess cavities healed by granulation. The other eye remained unaffected.

Of the few cases of ocular disease due to artificial fertilizer so far reported this is the first in which the whole orbital content was seriously involved.

Sommers advises that the spreading of artificial fertilizer be done by mechanical devices if possible, and always with the wind. Protective glasses should be worn. The hands should not come in contact with the eyes. A. C.

On a Noteworthy Result From Iodipin Therapy.

ZIMMERMAN, Görlitz (*Die Ophth. Klinik*, Nos. 18 and 19, 1908). The author reports a case of probable cerebro-spinal syphilis with lowered vision in each eye. O. D. 2/50, O. S. 5/25. Both disk margins were blurred, especially the right. After two injections of 10 c. c. 25 per cent. iodipin solution, vision improved remarkably. Altogether seven injections were made, vision eventually reaching 5/75+ in O. D., 5/5 in O. S., and the disks also assuming clear outlines. The subcutaneous method of administration is being favorably regarded particularly by ophthalmologists and where a long course of treatment is anticipated, it is certainly the more desirable. A. C.

Copper Wire in the Eye.

WEISS, JR., Gmünd (*Die Ophth. Klin.*, May 5, 1908, No. 9). The patient, a five year old boy injured his eye by striking it with a whip made of music wire. Examination several days later revealed a flap-shaped corneal wound, traversing the cornea obliquely, but not perforating it. From about the middle of the wound, a piece of copper wire partially covered with yellowish green pus passed backward through the anterior chamber and iris. The central lens portions were clear and the anterior chamber was of normal depth.

There were few subjective symptoms and only slight injection. Lest the foreign body during extraction should escape from view, the patient was anesthetized and neither mydriatic nor myotic instilled. The wound was then enlarged and a piece of copper wire (5 mm. x 3 mm.) removed. Recovery speedily followed.

Under atropine a peripheral, anterior and posterior cortical cataract just behind the iris wound was discernible. After the effects of the mydriatic had disappeared, the pupil was slightly retracted towards the injured portion, suggesting a probable adhesion between iris and capsule. Vision was always 5/5. Weiss believes the reaction was solely a chemical one. The prognosis of copper in the anterior portion of the eye, provided extraction is done reasonably early and no virulent microorganisms have been introduced, therefore seems to be good. A. C.

Myopia and Its Prevention.

Best, Dresden (*Muench. med. Woch.*, July 21, and 28, 1908). Although school hygiene has improved, the effect on school myopia, at least in Germany, has been nil. He considers the two chief causes of myopia to be near work and a predisposition founded on inherited ocular formation. It is often difficult, however, in a given case to ascertain which of the two factors is the more responsible. School myopia is a developmental occurrence, the result of continued use of the eyes for near distances, the eyes automatically adjusting themselves to such distances. It is therefore closely associated with accommodation.

The contraction of the ciliary muscle is opposed by the elasticity of the chorioidal membrane. The ectasia occurring at the posterior pole is due perhaps to the fact, that normally most of the growth takes place here or possibly is due to the defect in the chorioid at the optic nerve entrance permitting the elasticity of the chorioid to give way here first. According to this theory impaired elasticity of the chorioid at the posterior pole would predispose to myopia. The thinness of the sclera is in many cases correlative with deficient chorioidal development or may be secondary to diminished elasticity of the chorioid. Deficient chorioidal elasticity and deficient elasticity of the ciliary muscle are frequently correlative with insufficiencies of accommodation and convergence.

Best then briefly reviews the theories of Hess, Sattler, Stilling and others. He arrives at the following practical conclusions: The intermarriage of myopes, particularly high myopes, is undesirable; affected offspring should be kept from near work. The youthful myope should receive full correction.

The public, and especially instructors, should be informed that near work is the chief cause of myopia, insufficient illumination only acting detrimentally when it causes objects to be held more closely to the eye. He also advises the doing away of the Gothic alphabet and is in favor of more oral recitations and shorter school hours. A. C.

Simple Sclerectomy and Its Principal Application, Aside From Glaucoma.

Bettremieux (*Die ophthalomolog. Klinik,* August, 1908) suggests the removal of a superficial strip of scleral tissue, along a line at right angles to the corneal limbus, as a substitute for the method proposed by Lagrange, who combines with iridectomy an exsection of a strip of the sclera in order to secure a filtering wound. The operation is indicated in glaucoma and Bettremieux believes it better than Lagrange's method, as it does not necessitate iridectomy (to prevent iris prolapse). The conjunctiva is sutured over the scleral cut, and the resulting appearance is that of a grayish line, or spot. In no case did the operation cause ectasia of the sclera. He considers it indicated as a preventive measure in glaucoma, in cases where iridectomy is contraindicated and as preparatory to iridectomy and sclerotomy. He has also used it, with benefit, he believes, for vitreous opacities, and retinal detachment, by improving the outflow of the intraocular fluids. E. A. S.

Visual Disturbances After the Use of Atoxyl.

Herford (*Deutsche. mediz. Wochenschr.*, 1908, No. 18; ref. in *Wochenschr. f. Ther. u. Hyg. des Auges*, July 2, 1908). Herford reports two cases of blindness after the use of atoxyl. In a third case retinal hemorrhages appeared, following atoxyl injections, which, however, soon disappeared, when the drug was discontinued. He advises caution in the use of atoxyl; it should not be used when there is any disease of the optic nerve or of the inner coats of the eye. If general intoxication occurs, the course of atoxyl must be stopped as soon as the slightest visual disturbances present themselves. Atoxyl has a cumulative action. In discussing the subject Blumenthal said that it was necessary to use always fresh solutions, as they were decomposed by the action of light. E. A. S.

Concerning Trachoma and Its Treatment.

Pick (*Therapeut. Monatsh.*, February; ref. in *Woch. f. Ther. u. Hyg. des Auges*, April 23, 1908). Pick gives the following appearances as characteristic of trachoma: Uniform diffuse injection of the conjunctiva. Meibomian glands of the tarsus not visible; the follicles show various stages. The typical appearance is shown if when the patient looks down and out, and the upper lid is raised, a mass of large grayish red, confluent, soft granules protrudes from the upper inner angle. Further toward the temporal side younger granules may resemble the firm small follicle of follicular catarrh. In the conjunctiva of the tarsus above, small, light yellow, so-called elementary granules are often seen, proceeding from the upper tarsal edge. As Augstein has shown, the cornea often shows fine epithelial changes, in this stage, which can be detected by the use of fluorescin. In the treatment Pick relies upon excision of the tarsus especially where there are great thickening of the conjunctiva and tarsus, and distinct corneal changes. Galvanocauterization of the granules or pannus vessels is to be cast aside. Of the implantation methods for trichiasis that with mucous membrane from the lip is the only rational one. The jequirity-opthalmia for old pannus has not given him the results which were to be expected. Likewise the treatment with iodic acid pencils, recommended by Schiele, can not compare with the mechanical or operative methods in bad cases, according to his experience. E. A. S.

Contribution to Our Knowledge of Felix-Mas Amaurosis

Schoening (*Zeitschr. f. Augenheilk,* XIX-I, p. 233, 1908) reports a case of amaurosis due to Felix mas, taken for a worm cure, in which ophthalmoscopic examination was made seven hours after the appearance of the visual disturbance. This showed contracted arteries and dilated veins, and a peculiar folding of the retina probably dependent upon edema. The first light perception appeared 14 days later, and not in the center, as Nieden says is the rule, but in the periphery. The case was noteworthy also in that it occurred not in an anaemic individual but in a healthy young man, who had already had a worm treatment, and that castor oil was not administered as a laxative after the Felix mas. E. A. S.

The Value of Iridectomy in Glaucoma Simplex.

In the discussion of v. Hippel's paper on the value of iridectomy in glaucoma simplex, read the year before, Stolting (*Klin. Monatsbl. f. Augenheilk.,* July, 1908, p. 87) reported operation in ten eyes, eight with success and two with failure. He believed in early operation but warned against cases with decided contraction of the visual field. Leopold advised earliest possible performance of iridectomy, even in advanced cases with contraction of the field, although under these circumstances a bad result occasionally may be seen. If glaucomatous symptoms persist, sclerotomy and miotics may act favorably, though only rarely can they check the advance of the glaucoma. Segelken reported thirty eyes, with twenty-two iridectomy operations. In one-fourth of the cases vision was preserved or bettered. No immediate loss of vision was observed, and none was seen in any of the patients who could be followed. He therefore advised early iridectomy, as sclerotomy was not reliable, and thought miotics should be subsequently used. E. A. S.

Simulated Pseudoconjunctivitis Tuberculosa.

CHEVALLEREAN (Paris Oph. Soc., report in *Klin. Monatsbl. f. Augenheilk.*, March, 1908, p. 319) reported a case of localized swelling of the conjunctiva on the surface of which were five or six superficial, sharply defined ulcers, in a girl 17 years of age. Tuberculin instillation produced a sharp reaction which lasted eight days. The eye condition persisted three months, almost unchanged, until she was surprised in the act of irritating the lids, and it was found that she had simulated other diseases before. Treatment with sulphate of copper applications caused rapid disappearance of the lesions.

E. A. S.

Concerning the Treatment of Blennorrhea of Adults and Children by Bleno-Lenicet Salve.

ADAM, C. (*Therapeut. Monatsbl.*, March, 1908). Further favorable experiences in the treatment of blennorrhea adultorum by bleno-lenicet salve (*Muenchener mediz. Wochenschr.*, 1908, No. 11, ref. in *Wochenschr. f. Ther. u. Hyg. des Auges*, May 14, 1908). Adam reports thirteen cases of blennorrhea in adults treated with bleno-lenicet salve, ten of whom were discharged with intact corneas; only one showed adherent leucoma, and two others irregularly healed epithelial defects. He ascribes the good results to the protective action of the euvaselin (especially pure American vaseline, the melting point of which is raisd by the addition of ceresin) for the cornea, which is thus protected from the macerating effect of the discharge; and to the inhibiting action of the lenicet (the dust free, polymeric dry form of aluminium acetate) upon the secretion. E. A. S.

Concerning Glaucoma Occurring in Association with Albuminuric Changes in the Eyes.

TSCHIRKOWSKY (*Klin. Monatsbl. f. Augenheilk.*, September, 1908) writes concerning glaucoma in connection with albuminuric changes in the eyes, basing his report upon the results of two eyes. In one there was a large retinal detachment due to hemorrhage beneath the retina, caused by thrombosis of one of the venae vorticosae. The other was caused by periphlebitis of the central vein, which gave the clinical picture of diffuse hemorrhagic disease of the retina. He recognizes three groups of diseases in which an albuminuric glaucoma may appear: (1) Glaucoma with ordinary albuminuric retinitis; (2) Glaucoma with albuminuric detachment of the retina; (a) the ordinary albuminuric detachment, (b) the rare hemorrhagic detachment of the retina, and (3) Glaucoma with thrombotic disease of the central vessels of the retina due to albuminuria. In all three groups the pathological-anatomical underlying condition is an affection of the vessels; in the first group, in albuminuric retinitis, the entire vascular system of the retina is involved, in the second group, the detachment cases, the chief involvement is of the vessels of the chorioid especially the venae vorticosae, in the third the disease of the central retinal vein is most prominent. E. A. S.

Glaucomatous Excavation of the Nerve Head.

SCHNABEL (*Klin. Monats. f. Augenheilk.*, March, 1908, p. 317) reports a case in which he was able to watch the development of a glaucomatous excavation where no rise of tension could be detected, the case belonging therefore to the group called by v. Graefe "amaurosis with excavation of the optic nerve." He recognizes as a second group cases in which after permanent removal of tension by iridectomy, the excavation gradually develops, and he has observed clinically a number of such cases. One was reported in 1876, one in 1885, and there have been eight under treatment in his clinic since 1896. A third class is constituted by those in which the excavation develops while the tension remains high. In all three types the excavation is due to a gradual atrophy and disappearance of the intraretinal and intrachorioidal portion of the nerve, the vessels gradually sinking backward and toward the nasal side. In no case either before or during the beginning or the excavation is there any change in the position of the lamina cribrosa, or any deepening of the bottom of this physiological excavation. He disagrees with Schmidt-Rimpler, who considers amaurosis with excavation as ordinary atrophy in which an excavation appears, because he says there are no signs of ordinary atrophy, while none of the signs of glaucoma are absent.

In the discussion Prof. Klein-Bäringer claimed to have been the first to report cases in which he observed clinically the appearance of glaucomatous excavation, after permanent lowering of the tension by iridectomy. Meller thought there was a distinct elevation of the tension in Schnabel's first case, and thought the question could only be settled by the use of tonometer, such as that of Schiötz, which was used in Fuch's clinic. He believed also that it was probable that the cases in the second group would likewise show increase of tension, and he did not think the finger test was delicate enough to be relied upon.

Salzmann said the cases of amaurosis with excavation, or glaucoma simplex, belonged actually to the glaucoma group as they finally show a perceptible increase of tension as Hirschberg has recently again brought forward. He had observed the same in several cases. He considered the lateral displacement of the vessels to be due to a slight obliquity of the optic nerve canal, which is often found in glaucomatous eyes.

Zimmerman agreed with Meller, and reported a case in which excavation gradually appeared, although tension after iridectomy could never be detected as above normal. Subsequently the tension had been much reduced by the occurrence of retinal detachment and since then no further loss of the vision or field was observed.

Schnabel disagreed with Meller as to the superiority of the tonometer over the finger and declared himself well acquainted with the instrument mentioned by Meller. In his case there was no increase of tension. He had shown by microscopical preparations that the glaucomatous excavation was due to degeneration and absorption of the nerve fibres, and suggested that this degeneration might be due to a change in the quality of the intraocular fluid, which was evident in the cloudiness of the aqueous. E. A. S.

A Case of Unilateral Exophthalmos Cured by Removal of a Knife Blade 6 cm. Long From the Orbit.

Junius, Cologne (*Zeitsch. f. Augenheilk.,* February, 1909, Band XXI, Heft 2), found a 27-year-old man suffering from exophthalmos of the left eye, with both lids red and swollen. In a scar, fixing the eyeball down and out, a foreign body was noticed at the base of a fistulous opening. Operation disclosed a knife blade 6.1 cm. by 1.4 cm., which had been imbedded in the orbit six years before, during a fight. The patient had forgotten the occurrence and came to the clinic on account of purulent discharge from the eye which had continued for six weeks. F. K.

Nasal Causes and Treatment of Diseases of the Lacrimal Passages and of the Conjunctiva.

Meyer, A., Berlin (*Zeitschr. f. Augenheilkunde,* February, 1909, Band XXI, Heft 2), believes that the mucous membrane of the lacrimal passages are a continuation of the Schneiderian mucous membrane and can be regarded in the nature of an accessory sinus. The communication with the nose is broad and the blowing of the nose can readily force secretion into the lacrimal sac. The conjunctiva is guarded by a narrow muscular channel, which is normally closed.

In 88 cases examined by the author, 65 presented epiphora with some dacryocystitis, one case blennorrhoea, one fistula, three dacryocystitis, with conjunctivitis, six conjunctivitis with blepharonconjunctivitis, five blepharitis and seven keratitis with ulcer of the cornea. In seven of these cases of dacryocystitis no nasal disturbance was present. The most frequent cause was deformed nasal septum in 22 cases, sixteen cases were associated with adenoids, 7 with septal deviation, combined in two cases with enlarged tonsils. In 13 cases the inferior turbinate was pressed against the outer wall of the nose.

In 12 others there was hypertrophy of the turbinates, 9 presented purulent inflammation of the accessory nasal sinuses, while three had genuine and three syphilitic ozena.

Deviation of the septum and affections of the septum were most frequently present in ephiphora, whereas in inflammation of the lids, conjunctiva, and cornea, adenoid vegetations were most commonly seen.

The author believes that the nasal treatment is most important in getting rid of the cause in nearly all cases of dacryocystitis.

The Solution of the Problem of Ball Implantations.

SCHMIDT, H., Willhelmshaven (*Zeitschr. f. Augenheilkunde,* Band XXI, Heft I, January, 1909), records his further experience with implantation of balls after exenteration, in five cases. The implanted eyes have been quiet for periods varying from one and one-half to nine and one-half years and have not changed in size or appearance. The second eye has in all cases remained unaffected. The author records a case in which he implanted a ball in Tenons Capsule with a good result. F. K.

The Anatomical Changes Noted in the Occurrence of the Ophthalmic Picture of Blocking of the Central Artery of the Retina Following Direct Injury to the Orbit.

MICHEL, PROF., Berlin (*Zeitschr. f. Augenheilk.,* February, 1909, Band XXI, Heft 2). The anatomical explanation of the occurrence of the ophthalmic picture of embolism of the central artery of the retina after direct injury has not been possible previous to the author's case. The patient was a sixteen year old boy who was struck in the left eye by a bamboo stick. The appearance presented was that of great exophthalmos, with marked bleeding from the subconjunctival vessels. Ophthalmoscopically it presented the typical appearance of thrombosis of the central artery of the retina.

The disk was pale and slightly edematous, as were the neighboring parts of the retina. The macular region was very edematous, with a cherry red spot in the macula. The retinal arteries were partly filled with blood and the veins overfull. Blindness was complete. The patient died six days later of tetanus.

Previous to death, exenteration of the orbit was undertaken and a piece of wood 4 to 5 cm. long and 1 to 2 cm. long was found imbedded at the apex of the orbit in ill smelling pus.

The orbital roof was removed and the dura found normal. The symptoms rapidly increased and the patient died suddenly.

Microscopic examination showed the retinal veins very full of blood, indicating venous stasis. The central artery was filled with a thrombus extending to its exit from the ophthalmic artery.

In consequence of the interruption of the arterial flow, there was developed a necrosis of the axial lying nerve tissues in the orbital portion of the optic nerve and a stasis, combined with edema of the tissues of the optic nerve head and the inner retinal layers.

The retina showed folds and hemorrhages. The edema and hemorrhages explain the appearance of cloudiness of the nerve head and retina especially in the circumfoveal zone. F. K.

The Eyeground Findings in Cerebral Sinus Thrombosis.

Bartels, Martin, Strassburg (*Zeitschrift f. Augenheilkunde*, January, 1909, Band XXI, Heft 2), reports six cases of thrombosis of the venous sinuses following otitis. In three cases choked disk developed after sinus operation, the swelling reaching its height two to five weeks after the operation. The disk was prominent, with numerous hemorrhages and white plaques in the retina. There was no apparent disturbance of vision and no atrophy followed. The author's conclusions are that the complete abolition of the blood channel of both cavernous sinuses will not, of necessity, cause choked disk even when the orbital veins are thrombosed.

The septic nature of the thrombus does not alter the result in the first week, at least.

The appearance of choked disk in thrombosis of the cavernous sinus indicates a circumscribed intracranial and therefore operable complication. A marked optic neuritis after operation for otitic sinus thrombosis, does not indicate a serious prognosis of the general condition of the patient. It will disappear spontaneously without disturbing the vision. The postoperative choked disk may appear without any other objective or subjective symptom. The explanation of the phenomenon is not possible at present.

An apparent or pseudo-neuritis (*"Scheinneuritis"*) can often be determined by examination of the patient's nearest relations, who are likely to have a similar condition. F. K.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

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ST LOUIS.

M. W. Frederick, M. D.,

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AND

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ST. LOUIS.

Guiacol and Ocular Tuberculosis.

Darier, A. (Guiacol et tuberculos oculaires, *La Clinique Ophtalmologique,* January 10, 1909, Vol. XV, p. 2), believes that guiacol is to tuberculosis what mercury is to syphilis. He tried it in two cases of keratitis parenchymatosa, where Koch's tuberculin had been used. A subconjunctival injection of 0.02 of guiacol cacodylate in 1 cc. of water caused the pain to disappear rapidly and in three to four days cure was complete. A second injection was necessary in one case. Encouraged by these cases, he tried it in other similar ones, with equally good success. He tried it also, with favorable results, in dacryocystitis, phlyctenular conjunctivitis, episcleritis, where the action was especially favorable, iritis, chorioiditis, and choked disk. He refers to a case of Arnold's, where a meningitis and optic neuritis were cured by inunctions of guiacol.

C. L.

A New Contribution to the Paraspecific Serum Therapy of Ocular Diseases.

Zimmerman, Goerlitz (Nouvelle contribution a la sérothérapie paraspécifique des affections oculaires, *La Clinique*

Ophtalmologique, January 10, 1909, Vol. XV, p. 9), treated with Behring's antitoxin 28 cases of infections of the eye, such as serpiginous ulcers, iritis, lenticular suppuration, etc. Of these, 4 were not benefited, and 24 were cured. In 13 other cases of ulcers of the cornea, which had already been treated by galvanocautery or paracentesis, 5 were cured by injection of 1500 units, 3 by 2500, 3 by 3000, and 2 required 4000 units. Considering the harmlessness of this treatment, it is desirable to test it on a large scale. C. L.

A Case of Severe Keratitis of Dental Origin.

Jocqs, R. (Un cas de kératite grave d'origine dentaire, *La Clinique Ophtalmologique*, January 10, 1909, Vol. XV, p. 23), claims that the most frequent source of reflex ocular troubles are the teeth, via the trifacial nerve. He has already published a case where extraction of the teeth was followed by a cure of trophic ulceration of the cornea, and now reports a second case. Here there was intense blepharospasm and photophobia with pronounced myosis. The left cornea was the seat of irregular foci of epithelial exfoliation. Some of the ulcers were greyish and others were transparent. There was a periorbital neuralgia. For a month this condition existed in spite of all therapy. Then, two carious molars and the canine of the upper jaw on the left side. In three days the photophobia and the blepharospasm had disappeared and the cornea rapidly recovered, with a few superficial leucomata, which little by little yielded to calomel ointment. C. L.

The Specific Therapy of Senile Cataract in the Early Stages.

Königshöffer, Stuttgart (Sur la thérapeutique spécifique des cataractes séniles au debut, *La Clinique Ophtalmologique*, January 10, 1909, Vol. XV, p. 27), refers to Römer's paper, read before the 35th meeting of the Heidelberg Society, and states that from 1897 to 1901 he, himself, had used an extract of the crystalline lens of animals, in the form of a stable, tasteless and odorless powder. His results were so minimal that he then discontinued the treatment. C. L.

Large Wound of the Cornea, Sclera and Iris; Disinfection by Enesol; Suture with Reindeer Tendon; Cure, with Almost Normal Vision.

Terson, Paris (Vaste plaie de la cornée, de l' iris, et de la sclérotique; désinfection par l' Enesol; suture au tendon de renne. Guérison avec acuité visuelle presque normale, *La Clinique Ophtalmologique,* January 10, 1909, Vol. XV, p. 29), reports the case of a man whose right eye was cut by a piece of his own glass. Three days later he presented himself for the first time for treatment. Almost the entire iris was prolapsed through a large wound involving the cornea, sclera and corpus ciliare. The eye was disinfected with enesol (salicyl-arsenate of mercury) and iridectomy was made. The conjunctiva was elevated and two reindeer tendon sutures were put through the episclero-conjunctival tissue. Healing was normal, the lens was transparent. There is, of course, practically no iris, and the corpus ciliare can be seen directly. Vision with correction is almost normal. He has used enesol with good results in a great variety of syphilitic eye conditions, even in those of an hereditary character. The injection is made intramuscular, in the gluteal muscles, and consist of an entire globule. The pain is usually less than with other mercury salts. Subconjunctival injections, even of a few drops, are usually irritating. Ten daily injections have been sufficient to effect a cure. Locally, it is of great benefit as a disinfectant in conjunctivitis, blepharitis, dacryocystitis, etc. The use of reindeer tendon in ophthalmic surgery is of great benefit, since it is firm and soluble. C. L.

Sarcoma of the Orbit Cured by Radiotherapy.

Van Duyse and Denobelle, Ghent (Sarcome de l'Orbite guéri par la Radiothérapie, *Archives d'Ophtalmologie*, January, 1909, Vol. XXIX, p. 1), refer to the cases of Beclére, Coley, Sjögren and Fox, and then report one of their own. In a boy of 16, very cachectic, there was a large, ulcerating and hemorrhagic tumor of the right orbit, which displaced the eye directly forwards, and completely surrounded it, so that it could no longer be made out, except as a yellowish area in the center. The history shows that for nine years the boy has had repeated attacks of palpebral edema, while his friends say that his eye has always protruded. Examination showed metastases in various parts of the body. The prognosis was rendered graver by the marasmus, which also made an operation impracticable.

Accordingly, recourse was had to the x-ray, used 10 minutes every other day for four days, and then an intermission of fifteen days. There was gradual decrease of the tumor mass, recession of the eye into the orbit, assumption of a cicatricial aspect and loss of pain. In one and a half months the patient left the hospital with no signs of sarcoma of the orbit. Treatment of the metastases seemed unfruitful. Not enough time has elapsed to show whether or not the cure of the orbital tumor will be permanent. C. L.

The Pathogenic Differences Between Irritative Glaucoma and Simple Glaucoma.

SCALINGI, Naples (Sur les Différences Pathogéniques entre le Glaucome irriiatif et le Glaucome simple, *Archives d'Ophtalmologie*, January, 1909, Vol. XXIX, p. 11), reviews the principal theories concerning glaucoma and shows that they all have in common the assumption that the pathogenesis is the same in both forms. To this the author takes exception. The theory has always been that the intraocular fluids leave the eye by a purely physical process, viz.: filtration. It is, however. rather a complicated biologic phenomenon in which absorption predominates. This is brought about by the ordinary connective tissue and capillaries of the bulbus.

In the acute glaucoma, there is an increase in the fluid in the vitreal chamber, causing a pressure upon the connective tissue of the balb and its capillaries with resulting stasis, i. e., there is a quasi acute insufficiency of absorption. In subacute glaucoma this takes place only when the pressure upon the capillaries or the presence of fluid, rich in proteids in the connective tissue, enter spaces and prevent proper absorption. In either case an operation may allow the tissues to recover their normal tone.

In chronic irritative glaucoma, the absorptive integrity of the tissues no longer exists, consequently an iridectomy has little effect.

In simple glaucoma, however, instead of an increase of intraocular fluid, there is a normal amount, and the lesion exists primarily in the absorptive tissues. They have undergone such changes as to cause them to lose their physiologic qualities, consequently normal secretion causes an accumulation of fluid within the eye. The disease is a slow, insidious one, unless there happens to be some vaso-motor trouble, which gives it the character of an irritative glaucoma.

The difference between the two forms may be expressed by saying that the former is transudative, and the latter hypoabsorbent. In the latter, the connective tissue changes are primary, and the increase in tension secondary. In the former, the increase in tension is primary, and the connective tissue changes secondary.

An iridectomy to have any value should be peripheral, up to the root, so that the new-formed connective tissue, replacing the iris, may put the anterior chamber into communication with the suprachorioidal space. In simple glaucoma, incision of the iris angle is the best form of operation, allowing a greater extent of new-formed connective tissue.

According to this theory, the quantity of the intraocular fluid remains about the same, depending on the integrity of the ciliary epithelium, but a change in its character caused by vaso-motor conditions, causes edema of the vitreous which results in the irritative form of glaucoma, as explained above.

C. L.

Sclerotomy and Iridectomy in Glaucoma.

Abadie, Ch. (Sclérotomie et Iridectomie daus le Glaucome, *Archives d'Ophtalmologie*, January, 1909, Vol. XXIX, p. 21), replying to an article by Lagrange in the November (1908) number of Archives, insists that the filtration scar, so-called, had nothing to do with the cure of glaucoma. As proof of this, he cites its lack of success in simple glaucoma, also cases where iridectomy with a resultant minimal corneal or scleral scar gave good vision, while in some with a typical cystoid scar the vision remained bad. In simple glaucoma, iridectomy, also, seems to have no effect, but in chronic glaucoma, accompanied by appreciable rise of temperature, colored halves, etc., it has a very beneficial action. Although sclerotomy alone, or iridosclerotomy, have cured cases of glaucoma, the same result has been achieved by the much simpler operation of iridectomy.

C. L.

Eight Cases of Electrical Ophthalmia.

COULLAUD, Paris (Huit Cas d'Ophtalmie électrique, *Archives d'Ophtalmologie*, January, 1909, Vol. XXIX, p. 26). Some firemen were exposed for about 45 minutes to an intense electric arc 65 centimeters long, formed by a short circuit between two wires carrying 550 volts. About 17 hours later, Coullaud was called to attend them on account of severe pains in the eyes, lacrimation, photophobia, blepharospasm, conjunctival hyperemia, and feeling of foreign body in eye. In some cases, there was a slight loss of visual acuity, but in all cure was complete. Points of interest are: (1) The period of incubation varied from 7½ hours to 20 hours. (2) The symptoms were relatively benign. (3) The longer the period of incubation, the quicker the cure. Ophthalmoscopically, there was a dilatation of the retinal veins and somewhat of a contraction of arteries. C. L.

A New Method of Tarsorraphy.

PASCHEFF, C., Sofia (Nouvelle Méthode de Tarsorraphie, *Archives d'Ophtalmologie*, January, 1909, Vol. XXIX, p. 35), describes a method which has given very good results in lagophthalmus. There are four steps.

1. An intermarginal incision of the external part of the lids and the external canthus.
2. Excision of a triangular piece of skin from each lid, the size depending on the amount of closure to be obtained.
3. Suture of the tarsal borders, which have been previously freshened.
4. Suture of the triangular colobomata.

The advantages claimed are that the cilia are not displaced, and that there is no deformity of the external canthus.

C. L.

Cyclopia, Cryptophthalmus and Colobomatous Cysts.

VAN DUYSE (Cyclopie avec Cryptophtalmos et Kystes Colobomateaux, *Archives d'Ophtalmologie*, February, 1909, Vol. XXIX, p. 65), reports a case of a fetus, at full term, where the only anomalies were those of the face. In addition to a nasal deformity, the eyes were cryptophthalmic and their posterior segments were fused, causing cyclopia. The right eye presented a colobomatous cyst, lying between the bulbus and the lower lid. In both eyes there was a coloboma of the corpus ciliare. There is a description of the microscopic findings, together with several drawings. C. L.

A Case of Angioplastic Sarcoma of the Iris Successfully Treated by Iridectomy.

Lagrange, F., Bordeaux (Un cas de sarcome angioplastique de l' iris traité avec succés par l' iridectomie, *Archives d'Ophtalmologie,* February, 1909, Vol. XXIX, p. 78), reviews the literature dealing with iridectomy for sarcoma iridis, and reports a case of his own in a woman, aged 38, with glaucomatous symptoms, who had a tumor on the inferior portion of the iris. An iridectomy was performed, the iris being caught by two forceps, one on each side of the tumor, to avoid the danger of lacerating it. Microscopically, it was an unpigmented angiosarcoma. Cure was uninterrupted, and has remained permanent for 38 months. C. L.

Tumors of the Fourth Ventricle and Ocular Troubles.

Coutela, Ch. (Tumeurs du iv ventricle et troubles oculaires, *Archives d'Ophtalmologie*, February, 1909, Vol. XXIX, p. 85), reports a case of angiolithic sarcoma of the fourth ventricle. Among the interesting train of symptoms, the following were noted in regard to the eyes: retinal hemorrhages, peripapillar in position, right choked disk, beginning left optic atrophy, and vitreal opacities. Vision was reduced to light perception. C. L.

Fibromatous Degeneration of a Chalazion.

Cosmettatos, Athens (Transformation fibromateuse d'un chalazion, *Archives d'Ophtalmologie,* February, 1909, Vol. XXIX, p. 102), reports a case of a patient, aged 31, with a tumor of the lower lid of the size of a small nut. Its position and appearance led to the diagnosis of chalazion. It was extirpated, the operator noticing its extreme hardness and the great hemorrhage. Microscopically, it consisted of granulation tissue and fibrous tissue, the latter greatly prepondering.

C. L.

Functional Restitution in Ocular Pareses.

Landott, E. (La restitution fonctionelle dans les parésies oculaires, *Archives d'Ophtalmologie*, March, 1909, Vol. XXIX, p. 129), claims that in order to judge of the value of a surgical intervention, it is necessary to know the state of the mobility before and afterwards. To do this, one should measure the angle of deviation, both objectively and subjectively by the diplopia, the false projection, the excursions in the different directions, and finally the field of binocular fixation. He describes two cases, illustrating his point of view. C. L.

Demonstration of How to Make a Fistula by Sclerotomy in the Region of the Canal of Schlemm.

Lagrange, F. (Démonstration anatomique et expérimentale de cette fistulisation par la sclérotomie dans la région du canal, *Archives d'Ophtalmologie*, March, 1909, Vol. XXIX, p. 138), defines simple glaucoma as a disease of the eyes characterized by slight increase of tension, intermittent sensations of haziness, seeing of halves, etc. For this, he claims that his operation gives very good results. In as much as he does the sclerotomy first and the iridectomy afterwards, he calls the operation sclerecto-iridectomy. During the progress of healing, the scleral cicatrix is soft and contains small fistulae, thus allowing the intraocular fluid to penetrate it, justifying the term, "filtrating cicatrix." He prefers the term "fistulisation of the eye," because the object of the operation is to produce these macroscopic or microscopic fistulae. The author performed his operation upon a dog and nearly a year later enucleated the eye for examination, unfortunately incising the subconjunctival cyst. Microscopically, the base of the iris and the tendon of the ciliary muscle were shown incised. As the lips of the scleral wound had not reunited, a permanent opening furnishes communication between the anterior chamber and the subconjunctival space. There is thus found a large pocket limited by connective tissue. On the other hand, the chorioidal spaces communicate with the anterior chamber through the iridectomy wound. In addition, there are several smaller subconjunctival spaces which communicate with the large one. C. L.

Intraocular Tuberculosis and Sarcoma Iridis.

OFFRET (Tuberculose intra-oculaire et sarcome de l' iris, *Archives d'Ophtalmologie*, March, 1909, Vol. XXIX, p. 152) offers as a proof that cancer and tuberculosis are not mutually exclusive, a case of intraocular tuberculosis and sarcoma of the iris. In an eye enucleated for tumor of the iris. Microscopically, the tumor was an unpigmented sarcoma, probably arising from the retroiridial pigment layer. In addition, tubercular lesions were found in the papilla, retina, chorioid, sclera, ciliary processes, ciliary muscle and iris. They were typical tubercles. Microscopically, tubercle bacilli were found in the sclera. There is no proof that the tumor was of a bacillary origin, but there are the following presumptions:

(1) The coexistence and close relationship of the sarcoma and the tubercles.

(2) The abnormal situation and peculiar constitution of the sarcoma.

(3) The abundance and degeneration of the connective tissue in many parts of the tumor. C. L.

Traumatic Recurrent Corneal Neuralgia.

CAUVIN, CH., Nice (De la névralgie cornéene traumatique récidivante, *Archives d'Ophtalmologie*, March, 1909, Vol. XXIX, p. 163), reports a case of this rare condition, and reviews the literature concerning it. His patient was struck on the left eye by elastic garter. There was a dull pain, which instead of decreasing during sleep became more and more lancinating, especially on opening and closing the lids. He passed a bad day, and consulted Cauvin that evening, fearing he would be unable to sleep. His upper lid was edematous. Attempts to separate the lids elicited cries of pain. If they are held out of the way, and the globe raised, the pain is relieved almost instantly. There are lacrimation and photophobia. There is considerable pericorneal injection. By means of the lens, a small vesicle, the size of a pin's head, is found at the lower end of the vertical meridian, some millimeters from the limbus. It consists of an elevation of the corneal epithelium. Allowing the lid to strike this causes intense pain, which is relieved by lifting the lid. The supraorbital nerve is painful at its point of exit. Tension is diminished. Treatment was sedatives, hot compresses and ointment of cocain, atropin, and iodoform. This gave no relief. Massage around the orbit for 15 to 20 minutes with 10% dionin ointment was tried. This produced almost immediate relief, and all trace of the corneal lesion disappeared. Occasionally he has pain in the eyes in the morning, especially after he has had sexual intercourse the preceding night.

Three months later he was struck on the same eye by a piece of confetti, which a few hours later gave rise to an attack similar to the above. Similar treatment caused cure at the end of a week. Nine months later, patient was struck on the same eye by his spectacles, and went through a similar attack. Injection of sterilized air had no effect. Dionine again gave relief. C. L.

A Simple Means of Determining the Principal Meridians in Astigmatism.

Clerc, J., Grenoble (Note au sujet d'un moyen simple pour déterminer les diamétres principaux dans l'astigmatisme, *Archives d'Ophtalmologie*, March, 1909, Vol. XXIX, p. 177), gives the following methods: On a piece of paper, white or slightly grey, there are drawn alternate green and red lines 4 mm. broad by 6 cm. long. The red color should be less saturated than the green, in order that a normal eye may be able to distinguish the two colors at 5 meters distance. In cases of ametropia, the circles of diffusion cause a fusion of the borders with a resulting greyish color. Correcting the hypermetropia or myopia restores the separate colors. In simple astigmatism, however, by rotating the lines, they will be seen in their proper colors in the diameter of the astigmatism. A convex or concave spherical lens of a certain strength will make them appear in the opposite diameter, thus determining the amount of astigmatism. In mixed astigmatism, concave or convex lenses are used until the colors become visible in some one axis, which is the axis of astigmatism. Then one proceeds as in simple astigmatism. This is a very simple, convenient and inexpensive method, and the author claims that it is more exact than the ordinary ones. C. L.

ABSTRACTS FROM ITALIAN OPHTHALMIC LITERATURE.

BY

V. L. RAIA,

PROVIDENCE, R. I.

Thyroidin in the Treatment of Endocular Hemorrhage.

ANGELUCCI, PROF. (*Annali Di Ottalmologia*, Anno XXXVIII, Fasc, 1-2). Angelucci reports six cases of recurrent intraocular hemorrhage for which the administration of thyroidin produced the most beneficial results. In all these cases one eye had already been destroyed in its visual function by the same disease, which had been treated with ordinary means by other competent specialists, a fact which proves, according to the author, that not the more favorable conditions, but a real specific action of the preparation contributed to the good results obtained. In two cases of muscular hemorrhagic choroiditis in which the central vision had been lost by previous attacks in one eye, a fairly good one was preserved in the other; in two others, extensive hemorrhage of the vitreous of one eye had destroyed the sight in it several years before, and when the same affection recurred in the other eye good vision, after the arrest of the hemorrhage, finally was obtained with thyroidin treatment. Of the last two cases one was an absolute glaucoma from general synechiae, with repeated hemorrhages in the anterior chamber and intense pain, relieved with thyroidin, and the other a regular attack of glaucoma, for which an iridectomy was performed. Immediately after the operation a hemorrhage occurred in the anterior chamber, accompanied by intense pain, symptoms which were repeated several times, but always controlled with the administration of thyroidin. After three months the improvement was such that the fundus could be clearly seen, all the retinal hemorrhages had disappeared and the vision improved to 1/3. Prof. Angelucci, without any pretension whatever, advises further experiments with this preparation.

Ectropion Uveae Congenitum and Flocculi Pupillae in the Man.

Cecchettino, Dr. E. (*Annali Di Ottalmolgia*, Anno XXXVIII, Fasc, 1-2). Acquired ectropion uveae is physiological, phlogistic and senile, ordinarily limited to the margin of the pupil, and more frequent than the congenital form, of which only few cases have been reported. The author adds to this list two personal observations with microscopic examination, a fact which increases their value. A first case was one of cataract, for which extraction with a large iridectomy was performed; the other a case of pernicious anemia, followed by death and autopsy. The simple inspection revealed that the epithelium of the posterior surface of the iris at the level of the pupillary margin was everted on the anterior surface, on which it formed a distinct elevation, and beside this, specially of the upper margin of the pupil, globular, minute elevations were seen. This last appearance (flocculi), the absence of exudates on the stroma of the iris and any hyaline degeneration, the intact preservation of the sphincter pupillae exclude decidedly that in these cases the ectropion is acquired (senile, phlogistic, physiologic).

Therapeutic Action of Jequirity in Some Cases. of Carcinoma.

Rampoldi, Dr. R., Occulist in the Hospital S. Matteo di Pavia (*Annali Di Ottalmologia*, Anno XXXVIII, Fasc, 1-2). The author of this article has published in the Annali D' Ottalmologia of 1907 several observations regarding the use of jequirity in carcinoma of different parts of the body, and although he is very enthusiastic about this remedy, he hesitates to draw general conclusion until many other cases have been observed and experimented. In the different forms of epithelioma of the face and the lids, he applies gelatinous discs or the fluid extract of jequirity with occasional use of deep injections in the body of the tumor of one or several drops of the liquid. There is a general and local reaction following each application and necrosis of the growth with diminution of the same, and cicatricial formation, the action of the drug limiting itself exclusively to the abnormal tissues and sparing the sound ones. Incidentally, the author speaks of the favorable results obtained also in tubercular neoformations with the same method of treatment, a fact which establishes new clinical relation between tuberculosis and carcinoma.

Observations on Some Cases of Epithelioma of the Lids, Orbit and Conjunctiva, Improved With the Use of Jequiritine (Rampoldi's Method).

FUMAGALLI, DR. A. (*Annali Di Ottalmolgia,* Anno XXXVIII, Fasc, 1-2). Fumagalli has applied the experiments which we have mentioned in the previous abstract to three cases in Prof. Reymond's clinic in Turin, two recurrent epithelioma of the orbit, propagated from the skin of the lids, and one of the bulbar conjunctivia. In the first one enucleation had been performed by others, and, when he examined the patient, he found the orbital cavity full of malignant neoformation, for which exenteration of the orbit was performed, and a plastic operation on the forehead and cheeks to reform the destroyed lids. With all this, there was a reproduction of the tumor, and then the author availed himself of the researches already spoken of, and treated it with jequirity, following the rules laid out by Dr. Rampoldi. A cicatricial tissue took place in the orbit, and no more reproduction was observed henceforth. By following the same method, an epibulbar epithelioma (the third case) was arrested in its course and the eye was saved. Dr. Fumagalli has used the ophthalmic gelatinous discs and the liquid of jequiritine in different strengths according to the formula Rampoldi-Capini and prepared by Zambelletti, of Milan. These preparations have been tried also in trachoma with satisfactory results.

Abscess of the Bulbar Conjunctiva Simulating a Tubercular Affection.

FUMAGALLI, DR. A. (*Annali Di Ottalmolgia,* Anno XXXVIII, Fasc. 1-2). Purulent collections of the bulbar conjunctiva are very rare, Saemisch only incidentally mentioning them in Graefe-Saemisch Handbuch. Other writers have reported cases of abscesses of the conjunctiva, but these have been found on the palpebral side of this lining membrane. Dr. Fumagalli's case is a girl of 7 years of age, who, after having been exposed to a strong wind, felt irritation and some pain in one of her eyes, which became soon red and swollen on the inferior part of the bulbar conjunctiva. This swelling was as large as a pea, covered by blood vessels and resembling a tubercular growth. The author, by means of a hypodermic syringe, found out that the tumor was nothing else than a pure abscess of the bulbar conjunctiva, and the pus inoculated in the rabbit's eye, did not produce any reaction whatever. Nor did the most scrupulous microscopic examination reveal traces of pathogenic micro-organism. As under the conjunctiva, at the side where was the abscess, a piece of some kind of stone was found, the collection of pus was explained as the consequence of a chemical reaction, due to the foreign body and the probable rubbing by the fingers of the patient.

Extirpation of the Lacrimal Sac With Curettage of the Nasal Duct in Chronic Dacryocystitis.

Fumagalli, Dr. A. (*Annali Di Ottalmolgia,* Anno XXXVIII, Fasc, 3). Since my last article on this subject in 1904, nothing important has been added except slight modifications by Dr. Basso, who enucleates instead of curetting the mucosa of the nasal duct, and by Dr. Scimeni, who injects through the lacrimal canaliculi into the sac pyoctanine blue, in order to facilitate, according to him, the separation of its mucosa from the other tissues. The present writer thinks that the best guide for the limitation of the sac is the internal palpebral ligament, which is in front of it, and appears, as soon as the skin has been incised, as a white narrow band, and which he severs. To what he previously said, now he adds, after four years' further experience and 400 new cases of extirpation, local anesthesia, local anemia with a new preparation called cochrene and intradermic sutures. Local anesthesia and anemia is obtained with the injection of this preparation, composed of cocaine and suprarenal extract in physiological serum. By means of this the extirpation can be performed bloodless and in ten minutes.

Subcutaneous Injections of Alcohol in the Treatment of Blepharospasm and Spastic Entropion.

Fumagalli, Dr. (*Annali Di Ottalmolgia,* Anno XXXVIII, Fasc, 3). Many remedies have been tried in essential blepharospasm and the secondary due to affections of the conjunctiva and cornea and in entropion of old age, specially of the lower lid, but without avail. Surgical procedures also have been advised, with the same results. After having read the experiments of Valude and Schloesser, who used injection of alcohol at the exit of the facial for spasmodic affections of the orbicularis, Fumagalli obtained splendid results in these affections with the same injections near the supraorbital nerve and for the entropion of the lower lid in the region of this latter. The author thinks that the beneficial results are the effect of paralysis of the nervous filaments of the supraorbitalis and orbicularis. The solution which he has used is as follows: Alcohol at 96°, grams 30; distilled water, sterilized and boiled, 60 grams, without the addition of anesthetics, which he considers perfectly useless. One or two injections are ordinarily sufficient, but sometimes these must be repeated for several days.

SOCIETY PROCEEDINGS.

SECTION ON OPHTHALMOLOGY.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Meeting February 18, 1909. Dr. William Zentmayer, Chairman, presiding.

Dr. de Schweinitz demonstrated two patients on whom the operation of Kuhnt as modified by Szymanowski had been practiced for the relief of senile ectropion. In one patient the operation had been bilateral and in the other unilateral. In both instances, particularly the bilateral case, the result was perfect, and Dr. de Schweinitz recommended this operation as one which seemed to fulfil the indications better than any other with which he was acquainted. Of the patients, two in number, three operations had been performed, Dr. de Schweinitz having done one, Dr. Shumway one, and House Surgeon Dr. Keith the third.

Dr. de Schweinitz also demonstrated a case of bilateral simple extraction of cataract with perfect result as to pupil-position and mobility, and with the somewhat unusual visual acuity of 6/4 in one eye and 6/5 in the other.

Dr. Risley congratulated Dr. de Schweinitz upon the admirable result reached in both of the cases presented, and said that in the extraction of cataract it was an unusual experience to secure two central, round, mobile pupils in the same patient.

Double Cupping of the Nerve Head.

Dr. George S. Crampton exhibited a case of *Chronic Non-inflammatory Glaucoma.* In the left eye, situated within the usual pathological excavation, there could be noted an additional small cup. The tension of the globe was not increased.

Persistent Pains After Enucleation, Apparently Hysterical.

Dr. S. D. Risley presented a young woman whose left eye had been enucleated in August, 1900, for a rupture of the ball at the corneoscleral limbus, produced by a missile on the Fourth of July. Enucleation was refused until the fellow eye showed unmistakable signs of secondary ophthalmia. There was a fluffy fundus, photophobia, and impaired vision, associated with severe midfrontal pain and tenderness. A skiagraph failed to show the presence of a foreign body in the injured eye, orbit, or periorbital region. The pain and tenderness were not relieved by enucleation. A skiagraph was again made, but with negative results, and the orbit explored but without finding any focus of suppuration, foreign body, or other cause for the pain and tenderness to pressure which persisted in the ethmoidal region. The fundus condition in the right eye and the acuity of vision slowly improved, but the pain persisted after more than eight years, during which time the girl had regularly haunted the clinic with her complaints. A careful renewed study then showed a spiral field for form and colors and a reversal of the color fields. The fundus of the right eye is now healthy and both frontal sinus and the ethmoidal cells are free from disease. Dr. Risley regarded the case in its later history as one of hysteria.

In the discussion Dr. Posey cited a case of traumatic delirium, following a gunshot wound of the face, the ball traversing the nares and lodging in the crotch formed by the insertion of the optic nerve into the globe upon the opposite side. The delirium appeared about three weeks after the injury, and the patient never recovered her full mental faculties until the bullet was removed from the orbit.

Nodular Opacities of the Cornea.

Dr. Zentmayer presented a patient with *Nodular Opacities of the Cornea.* M. K., female, aged 24 years, single, poorly nourished and of low mentality. At the age of 14 years the patient had photophobia, lacrimation, and slight redness of eyes, with failing vision. She was fitted for glasses at that time, but they did not improve vision.

Family history negative.

Examination of the chest shows a high-pitched note and a loud systolic murmur at the base of the heart.

In both corneæ there are numerous grayish dense opacities easily visible with the naked eye, which on examination with the loup are seen to present a great variety of form—rounded, triangular, and principally irregular. They vary in size from

0.5 to 1.5 mm. They are grouped in a somewhat oval area, the upper border of which is just above the center of the cornea and the lower border on a line with the margin of the lower lid, the whole being lengthened out in the fissural space. There is a tendency for the opacities to arrange themselves into curved lines, and in the left eye they form a distinct whorl. The entire cornea, except the extreme margin, is hazed through the presence of dust-like opacities. The larger opacities are mostly immediately beneath the epithelium, which is elevated, thereby giving to the surface of the cornea an irregular but unbroken surface. The fine opacities occupy deeper layers. The eye is free from congestion, and there are no evidences of past inflammation. The sensibility of the cornea is diminished. V. O. D. = 5/25; V. O. S. = 5/200.

There was constitutional but no local reaction to tuberculin. Microscopic examination of scrapings from one of the nodes showed a material resembling hyalin.

Dr. de Schweinitz was acquainted with the patient whose case history Dr. Veasey had reported, inasmuch as he had been an attendant, at the time of the report, in one of Dr. de Schweinitz's public services. His history and lesions had seemed to Dr. Veasey more nearly to correspond with those which had been described by Dr. Fehr in his well-known paper, "Family Punctate Degeneration of the Cornea." While the reports of nodular or guttate opacities, as described by Groenouw and later discussed by Fuchs, indicate that the disease is rare, if one takes into consideration all the varieties of this degeneration of the cornea, namely, grill-like keratitis, nodular opacities, and family punctate degeneration of the cornea, etc., as they have already been recited by Dr. Zentmayer, and considers them to be different types of the same affection, the condition is evidently not so very uncommon.

Dr. de Schweinitz referred to a case at present in his service in the University Hospital, in which the lesions were more nearly those which are usually described as lattice-form opacity of the cornea, and in which persistent efforts with massage with yellow oxide of mercury and dionin ointment had been entirely unavailing, in so far as any improvement of the patient's vision is concerned.

Dr. Posey asked Dr. Zentmayer if he was aware of any cause which might have excited the inflammation in the patient's eyes, and referred to a case which presented many of the characteristics of Groenouw's opacities of the cornea which he had seen in a man at Willis Eye Hospital, who claimed to have been exposed to the fumes of sulphuric acid generated in some of the processes of mining. In this patient the spots were more oval and did not take the form of a whorl, as noted in Dr. Zentmayer's case. Massage with yellow oxide salve and with powdered dionin over a long period of time did not change the character of the opacities.

Wound of the Left Orbit, Followed by Partial Oculomotor Palsy and Paralysis of the Trochlearis; Recovery.

Dr. de Schweinitz related the following case history: A man, aged 40 years, was struck by a flying splinter of wood, which penetrated the lower and inner portion of the left orbit, between the eyeball and the wall of the orbit, to the depth of 4 cm. The splinter itself was 6.5 cm. in length, and at its thickest part 5 mm. in breadth and 4.5 mm. in thickness. It was removed by a fellow workman with pincers, and twenty-four hours later, on examination, the patient presented complete ptosis; paralysis of the left superior rectus; limited movement in the line of the direction of the action of the internal and external rectus; apparently complete loss in the action of the superior oblique; preservation of the actions of the inferior rectus and inferior oblique; slight exophthalmos, the left eye being, as measured with Hertel's instrument, 5 mm. more prominent than the right; an oval fixed pupil; numerous punctate hemorrhages apparently in the retina on the right side of this membrane; and decided edema of the optic disk, the edges of which were blurred and its surface slightly swollen, the veins being large and tortuous. There was complete anesthesia over the distribution of the supraorbital nerve. Vision was reduced to counting fingers at 30 cm. Under the administration of iodides and mercury and repeated cold compresses followed by hot compresses, the patient gradually improved, and at the expiration of a month practically all of the symptoms detailed, in so far as the imperfections in ocular motility are concerned, had passed away, the only remaining evidence of involvement of the orbital muscles being a right hyperphoria of 5 degrees. Vision had risen 6/22, beyond which it could not be improved. The disk was extremely pallid on its outer surface. There were numerous spots of atrophy marking the positions of the former hemorrhages, and a marked irregular contraction of the visual field, which was lost below and to the nasal side.

Dr. de Schweinitz discussed the possibilities in the case and decided that direct lesion, as well as intra-orbital hemorrhage, must be invoked to explain all of them.

Dr. S. D. Risley agreed with Dr. de Schweinitz that the symptoms were probably largely due to hemorrhage into the orbit, with injury to the orbital tissues.

He referred to a case previously presented to the Society, where the tine of a hay rake had penetrated the orbit, resulting in retinal hemorrhages and optic neuritis, with consecutive atrophy. There was no associated ocular palsy. Dr. Risley thought it possible that in this case direct injury might have had some influence.

Suppurative Ethmoiditis.

Dr. Frederick Krauss reported two cases of *Suppurative Ethmoiditis* in children resulting in death. The first case occurred in a girl, aged 13 years, who had complained of toothache and cold in the head for two days. The left nostril was particularly affected, redness and swelling extending along the nose and forehead, involving both lids of the left eye. There was no proptosis or tumor formation in the orbit, but marked tenderness on the inner orbital surface. The temperature was 100°. The following day the child was delirious, and two days after she was first seen the patient became comatose, with a feeble pulse, temperature 106°, and apparently dying. Operation, without ether, disclosed much tenacious slough-like pus in the anterior and posterior ethmoidal cells. The sphenoid was apparently free of pus.

The second case, also female, aged 9 years, whose condition had been diagnosticated as dacryocystitis, was brought into St. Christopher's Hospital with both eyes tremendously proptosed, the intense edema of the lids allowing them to fall over the proptosed globe, making a characteristic picture. Pus was disclosed issuing from the fronto-nasal fissure in small amounts. The temperature never fell below 106°—and the patient died. The post mortem disclosed no pus in the venous sinuses, no meningitis, or other intracranial lesions. Pus was found in the ethmoid cells.

The author believes that the acute suppurative ethmoiditis can readily be confounded with erysipelas, dacryocystitis, etc., and should be looked for in all orbital inflammations. In the above cases death occurred in a few days after the onset.

Dr. Posey thought it was difficult to ascertain the position of the ophthalmologist in the treatment of this class of cases, for he said that the cases described by Dr. Krauss were evidently instances of a virulent infection, probably of a streptococcic nature. Rhinologists were not in accord as to the best procedure to follow in these cases, many holding the operation aggravated the process. Dr. Posey thought that sera might be of greater service than operation, and said that, for his part, he would rather rely on this form of treatment in these so-called phlegmonous cases of sinusitis after the infectious diseases of childhood than on operative interference.

Dr. S. D. Risley said he quite agreed with Dr. Posey in his statement regarding radical operations in acute sinus affections associated with acute infectious diseases. He believed that operative interference was apt to hasten a final termination; moreover, after the proptosis, edema of the eyelids and chemois of the conjunctiva were present, showing that thrombosis of the cavernous sinus had already occurred, operations are useless. He thought a definite distinction should be drawn between this group of cases and chronic disease of the nasal fossæ and the accessory sinuses, with acute exacerbations. Dr. Krauss' contention that in these cases also there was danger of involvement of the cavernous and other intracranial sinuses was of great interest and was borne out by Dr. Thompson's observations, showing that the danger is especially imminent in disease of the sphenoidal sinus. In this last group of cases Dr. Risley thought it important that operation for the securing of free drainage should be done as early as possible.

Dr. Krauss, in conclusion, stated that the cases reported by him were moribund at the time of the operation, and no serum or other treatment would have been of avail. The operation did establish a positive diagnosis. As in appendicitis, if the disease does not quickly subside under treatment, but shows a steady tendency to increase, immediate operation should be advised. Late operation as, for instance, after involvement of the cerebral circulation, is practically useless. Early operation in the author's hands has always been devoid of danger, with practically no scarring or other deformity. Treatment with sera in the early stages of ethmoiditis suppurativa may be a strong factor in the future, but in the late stages it will probably prove to be of no value. Early recognition and prompt treatment are strongly urged in all cases.

Avulsio Bulbi.

Dr. Carl Williams presented a paper on *Avulsio Bulbi,* reported in full, page 486.

Discussion.—In favorable cases Dr. Posey suggested the possibility of replacing the globe in the orbit.

Dr. Harbridge (by invitation) stated that he had seen a case of avulsio bulbi in a woman, aged 40 years, the subject of epilepsy.

During a convulsive seizure the patient fell upon a stick two and one-half feet long and the thickness of the forefinger, completely avulsing the globe, the only attachment being a few strands of the inferior rectus muscle. The optic nerve was severed 4 to 5 mm. back of the globe.

Eye Speculum.

Dr. W. T. Shoemaker exhibited a new *Eye Speculum,* which was made by the Penn Surgical Manufacturing Company, of Philadelphia, embodying certain suggestions which he had made to them. Among its good points the following features were cited:

It is light in weight and short longitudinally, thus bringing its center of gravity nearer to the eye and reducing materially the tendency which many of the longer and heavier speculums have of displacing themselves by their own weight and leverage.

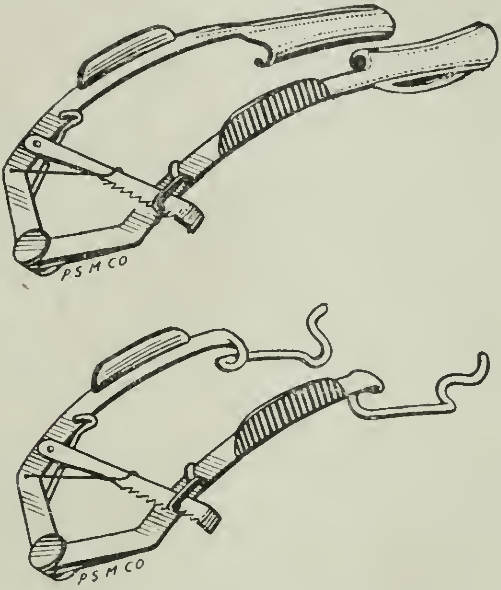
The blades when in use are parallel and not divergent. This permits of an even and uniform exposure.

It can be operated with one hand, and has a quick release, two points which are impossible with any speculum having a set screw.

The tension can be changed at any time to suit the needs of the case and the operator.

It will be made by the Penn Surgical Manufacturing Company, with solid blades or with wire blades and of steel or German silver, the latter material being necessary if the speculum is to be used in magnet operations.

Dr. Shoemaker then stated that a universal speculum probably will never be obtainable, nor would such be particularly desirable. All of the speculums, or most of them, on the market, have some good points and are suitable for certain eyes, so the surgeon who does much operating will probably always find it necessary to have a number from which the one suitable for the individual case can be selected.



Dr. W. T. Shoemaker's Eye Speculum.

Meeting, March 18, 1909. Dr. William Zentmayer, Chairman, presiding.

Uremic Amaurosis Following Scarlet Fever.

Dr. A. C. Sautter reported the following case history: A boy, aged 13 years, was admitted to the Municipal Hospital, Philadelphia, with scarlet fever in the desquamating stage and tonsillar diphtheria. Four days after admission uremia set in, with convulsive seizures, coma, and complete amaurosis, the pupils being dilated and not responsive to light.

Examination of the urine showed 2.75 per cent. albumin and granular casts. Amaurosis continued for nearly a week, when a gradual improvement followed, and about five weeks later he was able to read large print. There was some tortuosity of the retinal vessels, with slight veiling of the disk margins, otherwise the fundus examination was negative. The pupils now reacted to light, and were of equal size. Further examination revealed contracted fields, with a symmetrical sector-like defect in the inferior half of each field. There was no central scotoma. Vision: O. D. = 5/45; O. S. = 5/45. Type No. 2 read with difficulty. No evidence of accommodative palsy. In spite of the antinephritic treatment only slight visual improvement ensued during the next five months, at the end of which time the patient disappeared from observation.

In most of the cases of uremic amaurosis previously reported, vision returned to normal within eighteen to seventy-two hours and the pupils reacted to light.

The retention of the pupillary light reflex in the majority of instances, and the fact that homonymous hemianopsia has been observed in connection with uremia are in favor of ascribing the usual uremic amaurosis to a cortical lesion.

The case just reported, other cases where the pupils were not responsive to light, and still others where visible peripheral lesions accompanied uremic blindness, suggest that occasionally the more distal ocular elements may be involved.

Dr. Posey referred to a case which he had under treatment at the present time, of a boy aged 13 years, who had developed a pronounced neuroretintis in both eyes eighteen months previously, following a mild attack of scarlatina. The patient had received the best of systemic care by his family physician, and had seemed in fair health, although the ocular inflammation, which had subsided for a time, had recently reappeared with renewed violence.

Dr. Posey referred to the interesting paper of Sydney Stephenson on "The Ocular Changes of Renal Disease in Children," and said that this author thought that, were affections in the kidneys as common in children as in adults, retinal complications would be relatively as frequent in one class as in the other. Stephenson had failed to find a case of typical renal retinitis in association with acute nephritis, though he had observed bilateral papillitis, which resembled the choked disk of brain tumors. He divides the ocular changes in chronic nephritis into three classes, which may occur together or separately: (1) The retinitis which closely resembles that of adults; (2) papillitis; (3) neuroretinitis. Detachment of the retina is also occasionally observed, but in association with retinitis. Nettleship has made the important observation that the severe eye changes in forty cases of juvenile retinitis collected by him were larger than in any consecutive number of cases in older subjects.

Dr. Posey pointed out that a very interesting phase of the subject under discussion was the prognosis for life which could be made after ocular changes appeared in the eyes of children from nephritis, and referred in this connection to observations of Lawson and Sutherland, that albuminuric retinitis in childhood carries with it a prognosis as bad as it does in older subjects. Nettleship found that no fewer than sixteen of his patients died in an interval of less than four months after the discovery of the retinitis, and only five of his patients lived more than twelve months. In view of these figures, Nettleship thought that the prognostic significance of retinal changes in young subjects may actually be graver than in adults.

Dr. Zentmayer said that in May, 1903, he had been asked by a physician in this city to see his brother, aged 15 years, who had become suddenly blind. Four weeks previously he had had an attack of scarlet fever. The eruption had been unusually intense and the desquamation marked. He had been up and about for one week. On the second day he complained of anorexia and somnolence, and on the fifth day intense occipital headache and vomiting occurred, accompanied by a loss of vision except light perception. When seen by him eighteen hours after the onset of blindness, vision was returning, and large objects could be distinguished. The pupils were 2.5 mm., and reacted promptly to light. The fundi were normal. The urine had contained albumin. Sweating was advised, but before it could be induced the boy had eighteen convulsions. There was complete recovery of health and vision.

Dr. Zentmayer said that it would seem that the cases of postscarlatinous blindness might be divided into two classes: those in which the toxic agent acted upon the cortical centers, in which case the pupils would be found to react to light; and those in which the toxic agent acted upon more peripheral parts, probably the ganglion cells, in which case the reaction of the pupils would be affected proportionately with the reduction of visual acuity.

Steel Injury of the Eye.

Dr. T. B. Holloway cited the history of a patient who had come under his observation at the Phœnixville Hospital.

When first seen a few hours after the accident there was a slight injection of the ocular conjunctiva; the cornea revealed a linear cut about 8 mm. in length, which began at the upper and inner part of the cornea and extended down and out to the corneoscleral junction. The iris was likewise cut in a position corresponding to the lower and outer portion of this incision. There was no prolapse of the iris. The lens was turbid, and some opaque and swollen lens matter occupied a portion of the anterior chamber. The tension was reduced, while the vision was restricted to light perception. An *x*-ray examination showed a large foreign body situated in the lower and inner posterior segment of the globe. It was successfully removed with a Sweet magnet through an incision made beneath the internal rectus muscle, and well toward the internal canthus. The piece of steel corresponded in shape to the segment of a circle, and measured 11 mm. in length and 4 mm. at its widest part. The weight was 7/8 of a grain. The final vision was light perception.

A Case of Unilateral Retrobulbar Neuritis Due to Ethmoiditis, with Restoration of Vision.

Dr. Frederick Krauss cited the following case history: The patient was a female, aged 25 years, married. She complained of dim vision and a black spot before the right eye. Nasal symptoms were denied. The vision was 2/30 dimly, caused by a broad central scotoma. Absolute in part of its extent.

A deviated septum occluded the right nostril, allowing a partial view of the turbinates only after cocainization and force. After the evacuation of a few drops of pus the vision began to clear, and became nearly normal a few days after correction of the septal deformity and opening of the anterior and posterior ethmoidal cells. Eight months later the vision was normal.

In this case the indications of sinusitis were monocular retrobulbar neuritis, blocking of the nostril of the same side, and increased vision after evacuation of pus from the posterior ethmoidal cells.

Dr. Risley said he was glad that Dr. Krauss had again called the attention of the section to the important relationship which may exist between optic nerve disease and affections of the sinuses. Many cases of optic neuritis, optic atrophy, and disease affecting the uveal tract, of obscure etiology, Dr. Risley believed to be due to sinus disease. The anatomical relationship of the sphenoidal sinus and posterior ethmoidal cells to the commissure and the optic nerves in their course to the optic foramen created a peculiar liability to extension of disease from these bony cells to the optic nerves. In many skulls the bony walls were very thin. A specimen in his possession exhibited this fact in a remarkable manner; not only were the walls thin, but there was a diverticulum from the sphenoidal sinus lying above anteriorly, draining into the main sinus, and its paper-like inner wall forming a portion of the groove for the optic nerves.

Not only, however, were affections of the sinus responsible for optic nerve disease, but the *fons et origo* of many cases of persistent asthenopia, with fluffy, turgid, or wooly chorioid. He thought it doubtful if an acute sinusitis ever fully recovered. Chronic disease of the lining mucoperiosteum certainly persisted in many cases for a long time, and were liable on slight provocation to more or less severe acute exacerbations, at which time the uveal tract would become congested; the asthenopia, headache, etc., being a part of the symptom complex.

Dr. Posey said that Onodi had explained why optic neuritis might be occasioned by ethmoiditis as well as sphenoiditis, by his demonstrations that the posterior ethmoidal cells frequently joined in the formation of the optic foramen. Dr. Posey referred to a paper which he had read some years ago, in which he had shown that an early implication of the optic nerve in cases of sinusitis might be diagnosticated by a choking along the lymphatics of the retinal vessels, and by a blurring of the edges of the nerve ophthalmoscopically, while a diminution in the light sense, as demonstrated by Bjerrum types, was also present.

The Ocular Symptoms of Barlow's Disease, with the Report of a Case.

Dr. J. Hiland Dewey stated that the ocular symptoms of scurvy in children are ecchymosis of the lids, ecchymosis of the conjunctiva, hemorrhage of the conjunctiva, and exophthalmos. Of these symptoms, exophthalmos is alone peculiar to infantile scorbutus. Optic neuritis and retinal hemorrhage as occurring in adults with scurvy has not been observed in children, but the only record of an ophthalmoscopic examination having been made was one by Spicer in Nettleship's clinic, in which the findings were negative. Sutherland and Barlow in postmortem examinations record extensive hematomas of the dura, which might well give rise to either of these.

A black and blue eye in an infant, and due to no violence, as pointed out by Cheyney, can rarely be due to anything but scurvy.

The proptosis in one eye with ecchymosis of the lid may be followed in a few days by a similar process in the other eye, though this is apt to be less severe. This is caused by a hemorrhage into the easily distended space between the roof of the orbit and the periosteum.

The case reported was one in which a hand-fed infant, aged 11 months, had had a proptosis suddenly develop in one eye, followed in a few days by a marked bulging of the fellow eye. The eyelids of both eyes were ecchymotic, and there was a slight ecchymosis of the conjunctiva. The child was pale, emaciated, pseudoparalytic, and cried on being touched. There was a marked enlargement of the left thigh and knee, the left tibia and fibula were fractured, a large brawny induration existed in the left leg, and two small ones in right leg. A swelling was present above each wrist, a slight elevation of the gums could be noted around both upper and lower incisors, which were the only teeth present; had drivelled blood, and vomited blood at times. Black stools at intervals.

Rapid recovery under antiscorbutic diet.

Report of a Case of Keratitis Probably Due to Metastatic Gonorrhea.

Dr. Wm. Campbell Posey reported a case of *Keratitis probably due to Metastatic Gonorrhea.* The inflammation, which occurred in a male, aged 28 years, had the characteristics of an unusual form of vesicular keratitis engrafted upon an old macula, the central portion of the cornea being more or less opaque, and the seat of some six or eight small vesicles. The entire membrane was superficially hazy, and near the upper limbus there were three or four rounded opacities, which probably marked the seat of earlier vesicles. The cornea was avascular and the conjunctiva was but little injected. The eye had been inflamed twelve years previously, and had also suffered several other relapses. The patient was in robust health, but it was thought possible that the ocular inflammation might be connected in some way with attacks of urethritis with which he had been affected, the first attack having preceded by some weeks the primary involvement of the infected eye and a fresh outbreak of gonorrhea having been contracted shortly before the present inflammation in the eye appeared. Bacteriological examination of the eye discoverd gonococci on the cornea. Gonococci were also found in the secretion of the urethra. There was no history of arthritis.

The patient was admitted to the Willis Hospital, and, in addition to the local treatment, he was given antigonococcic serum. Although considerable febrile reaction followed, it was impossible to determine a local reaction. The eye continued to be actively inflamed for a long period, all forms of local treatment making but little impression upon it.

Dr. Posey referred to forty cases of affections of the cornea following systematic gonorrhea reported by Byers, of which nine were probably metastatic in origin, eight doubtful, being either primarily metastatic or else secondary to some preceding metastatic conjunctivitis, while one was due to secondary contamination from the conjunctival sac. According to Byers, one is justified in inferring that the keratitis associated directly or indirectly with systematic gonorrhea, is typically of a multiple and superficial nature, commonly symmetrical in character and central in situation.

Dr. Posey referred at some length to the gonococcic serum first introduced by Torrey and Rogers, and its action both in acute and chronic manifestations of gonorrhea. He said that the serum had been employed but rarely in ophthalmic cases. He had employed it himself in several other cases of ocular disease, both of whom were suffering from multiple arthritis, but was unable to note any demonstrable effect. He was inclined, however, to believe that the serum may not have been properly prepared or administered, and desired to suspend judgment regarding its value until he had made more numerous and better controlled tests.

Dr. Turner suggested that as gonococci were found in the secretion of the cornea, it was not a case of metastatic infection, but bacteria introduced probably by the patient, and also that the bacteria so introduced had lost some of their virulence. He stated that he had been on the lookout for case of undoubted metastatic eye infection to try a treatment which is eminently successful in gonorrheal arthritis, viz., 1/30 grain of bichloride of mercury with 1 to 2 drams of syrup of the iodide of iron three times daily.

Dr. Zentmayer asked in what percentage of cases gonococci had been found in the corneal tissue in the cases of other observers.

In closing, Dr. Posey said that he thought it unlikely that the gonococci which were found in the eye were there as the result of direct infection, as if such had been the case it is more than likely that active conjunctival symptoms would have been present. He said that it was well known, of course, that gonococci were found in the secretion at times in even metastatic cases, and that even when gonococci are not found in the conjunctival secretion, they are not far off, but lie embedded in the conjunctival tissue and excite the inflammation from that point. When gonococci are found in the conjunctival secretion, it indicates an exceptional intensity of inflammation. It is true that the patient had not suffered from arthritis, but many cases of metastatic ocular inflammation, whether they be keratitis or iritis, may occur without the presence of arthritis.

Dr. Posey referred at some length to the late John Griffiths' observations of ocular complications representing the sequels of gonorrhea, saying that this author thought the iritis which occurred in some subjects, even years after a urethritis, was due to that cause. He referred, however, to the observations of other British authors, particularly Collins, of the influence of gout in these cases and the necessity of taking that disease into consideration in each instance when dealing with the etiology of iritis. He pointed out that it has long been known that arthritis is particularly liable to involve gonorrheal subjects who are gouty, and his own views coincided with those of Collins, that where inflammations of the eye did rise years after gonorrhea, it was probable that they were gouty rather than of gonorrheal origin. The unusual vesicular type of the inflammation which was observed in the case under discussion, its resemblance to those reported by Byers, as well as the other factors, led him to believe that the inflammation of the cornea in the case under discussion had in all probability been excited by the micrococci or toxins of gonorrhea.

T. B. HOLLOWAY, M.D., *Clerk.*

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Meeting of February 8, 1909. The President, Dr. Frank Allport, in the Chair.

Acute Chorioiditis (?).

Dr. G. J. Schneider, Elgin, Illinois, exhibited a boy, aged 17, who noticed, six months ago, that he could not play ball, because he never was sure of the position of the ball. Examination showed cornea, sclera, iris and reflexes were normal. Vision, left eye equals 4/200; right eye, 20/40. With the ophthalmoscope the macula of the left eye was seen to be enlarged to one-half the size of a silver dime, circular with small dark radiating striae; right eye, the ground was similar to that in the left eye, except that the macula was smaller and the striae were not so marked. Physical examination negative; personal and family history negative, except that one brother has strabismus.

Dr. Dodd thought this case to be one of acute chorioiditis, due to a severe chilling. He has seen several of these cases in which he had obtained a definite history of chilling.

Dr. Snydacker thought that it was a retinal lesion rather than a chorioidal lesion.

Neuroretinitis Diabetica (?).

Dr. Major H. Worthington exhibited a man, aged 51, who about two months ago noticed that he could not distinguish objects with the left eye. For the past five or six years he has suffered much from thirst and has had excessive urination. Vision, right eye, 20/20; left eye, 9/200. In the eye there is every appearance of albuminuric retinitis, although repeated examinations have shown that there is no albumin in the urine, but from .8 to 1.5 per cent of sugar; specific gravity 1022. The mother died of pulmonary tuberculosis, and the father from a carbuncle of the cheek. Patient had typhoid fever thirty years ago. Denies venereal history.

Dr. Casey Wood was inclined to regard this as a case of thrombosis of the lateral vein, showing the picture of changes in the vein.

Punctuate Superficial Keratitis.

Dr. George F. Suker exhibited this patient. He was treated for four or five weeks on the expectant plan, and by exclusion he discovered that the middle turbinal was cystic at its posterior end, involving the anterior ethmoidal cells. Vision was 22/100—; correction, plus 2, combined with —3, axis 25°. Vision did not improve under treatment, and ten days ago the ethmoid cells were removed, together with the middle turbinate. Vision, with correction, now is 20/20. The spots in the cornea are now very minute. They never were confluent. There was never any evidence of inflammatory reaction. The other eye was never involved in the process.

Dr. Thomas Faith thought that unless the lesion in the cornea had been very much worse than it now seemed to be, there must have been something more than a corneal trouble. There was some evidence now of corneal trouble, but hardly enough to have reduced vision to 20/100.

Dr. Suker said that these spots were visible to the naked eye, and now they can sarcely be seen with Berger's loup and condenser.

Cilia in Anterior Chamber.

Dr. Mortimer Frank showed a patient, 21 years old, who, when three years of age, was accidentally struck in the eye with the point of a pair of scissors. One of the cilia of the eyelid evidently had been driven into the eye, and has been imbedded there ever since, to the temporal side of the limbus. It has never produced any irritation.

Dr. C. A. Leenheer saw a patient a year and a half ago who was working with a drill which broke and produced a perforation injury of the cornea. The metal carried in one of cilia, which imbedded itself in the lens. The lens is almost completely absorbed. One end of the cilia was on top of the iris. With a plus lens the patient has about 20/100 vision in that eye.

Dr. H. B. Young some time ago saw a case of cilia in the eye of twenty years' standing, and although the lens has been absorbed, there were no symptoms.

Double Tarsectomy.

Dr. Mortimer Frank exhibited a young man on whom he did a double tarsectomy for trachoma, with complete pannus of both eyes, seventeen months ago. The result was entirely satisfactory.

A Case of Traumatic Optic Atrophy.

Dr. A. H. Andrews: F. K., aged 27, a machinist, was injured Dec. 27, 1908, by falling backward and striking his head against a steam pipe. The patient thinks he was unconscious for a few minutes only, vomiting afterward, but walked to his home a few blocks away. The next morning he discovered that he was totally blind in the right eye. I examined this patient first on Dec. 31. There was an abrasion on the back of the head on the right side, but no depression of the skull. The fundus of the right eye was examined under a mydriatic. The retina was white and thrown into folds, the upper temporal and lower nasal being most prominent. The difference between the depressions and elevations seemed to be 3 or 4 D. Both the veins and arteries were smaller than normal and the margin of the disk could not be distinguished. The patient was placed in the hospital for two weeks, where hot applications and massage were administered. The folds in the retina gradually smoothed out, and the vessels, especially the veins, have gradually assumed their present condition. As now seen the veins can hardly be distinguished in places, while in other places there seems to be a small amount of blood in them. The arteries are more uniform in size, but much smaller than normal. A number of granulation areas can be seen. Along all the larger blood vessels can be seen perivascular degeneration. The principal point of interest in the case is the rapid fundus changes evidently caused by interference with the circulation, due to a distant injury.

Dr. Thomas Faith thought that Dr. Andrews' case was one of fracture of the orbit, which would account for the rapid changes taking place.

Dr. Andrews stated that the rapidity of the vascular changes was most interesting. Ten days ago the veins were full, although not distended. Three days later they were not quite so full, and three days ago they were empty. At the present time there is practically no blood in the veins. The perivascular degeneration has been progressive, as the veins and arteries shrunk. There has been no pain or other disturbance, other than that the patient is totally blind in that eye.

Inflammatory (Tuberculous) Swelling in Conjunctiva.

Dr. Charles P. Small exhibited a young man, who had an inflammatory swelling in the conjunctiva of the right eye, which somewhat resembled a phlyctenula. In the left eye there is a deep-seated opacity of the cornea. The patient appears to be entirely well, although when a young boy he had trouble with his hip joint, thought to have been caused by a fall. A few years ago the joint was resected and is now ankylosed. He also had scarlet fever with otitis media, the suppuration continuing for a number of years, then stopping, only to break out afresh. The ear is still suppurating. The Calmette reaction was looked for, the tuberculin being instilled into the left eye. A marked reaction was obtained.

Dr. W. E. Gamble thought that the process was rather too acute for tuberculosis, and that while a positive Calmette was obtained, this did not necessarily imply that the tuberculosis was of the eye. The focus might be elsewhere in the body.

Dr. Oscar Dodd considered it a typical case of tuberculous sclerokeratitis, such as Verhoeff, of Boston, reported. Verhoeff explained the paroxysmal appearance and disappearance of the nodules by assuming the presence of some focus in the body elsewhere than in the eye. Therefore Dr. Small's case would probably soon subside. He does not like to use the Calmette test, because of the bad results which are likely to follow. He knows of instances where the reaction persisted for months, even starting up a latent process.

Hysterical Blepharospasm; Report of Cases.

Dr. L. W. Dean referred to a case of double-sided functional amblyopia and blepharospasm with one-sided deafness that he had had under observation and in which treatment was ineffectual. Finally the patient was placed in a college for the blind, where she was put to work in the kitchen. After two or three months she was discharged, apparently well, although the fields were badly constricted. Eight or nine months ago she returned with a one-sided amblyopia and blepharospasm, from which she is still suffering. Treatment is ineffectual.

Dr. N. Remmen reported three cases of hysterical blepharospasm.

Dr. D'Orsay Hecht emphasized the fact that hysterical blepharospasms, as well as many other hysterical conditions referable to the eye and eyelid, are of great interest to the neurologist, who is likely to see quite as many of these cases as does the ophthalmologist. It is regrettable that these patients are not seen early enough, as this is a matter of some consequence in instituting successful treatment, depending upon promptness, more especially in the cases of very acute onset. When a patient has been subjected to a protracted treatment at the hands of the oculist, the chance for a timely and efficient cure is certainly impaired. He thought that there was some ambiguity clinging to the term blepharospasm, and that it was too often used interchangeably with the more common expression of habit spasm or tic. The eyelid tic, particularly in its unilateral form, is perhaps the most common of all tics. The condition of blepharospasm should be more thoroughly differentiated from tic than it is. A blepharospasm should be regarded as such only so long as it is contingent upon an acute sensory irritation, a demonstrable lesion or some irritation succeeding it. As soon as the source is removed and the irritation no longer continued, it should cease to be called a spasm, and becomes purely a tic. The physical has been replaced by the psychic impression, and the subsequent treatment must depend upon a thorough appreciation of this fact.

With reference to the second case reported by Dr. Remmen, and referred to by him as incurable, Dr. Hecht thought it should be looked upon as an obstinate case, one not likely to yield as quickly as if the onset had been acute, but nevertheless not without an ultimately good prognosis.

As concerns the hysterical ptosis, referred to as occurring in a child, that manifestation was rather unusual, but not at all rare, if one keeps reminded of the fact that hysteria occurs very much more commonly in children than is generally thought. Eyelid tic, chronic blinking, is very common among children. In making a diagnosis of hysterical ptosis, he thought it relevant to add that myasthenia gravis should not be lost sight of as a diagnostic possibility. Dr. Hecht cited an instance in his own practice of what the oculist would have chosen to call hysterical blepharospasm, which could not be so regarded if it is admitted that no demonstrable sensory irritation was causative of the condition. A man had attended a banquet. in the course of which a flashlight picture was taken. The technic had not been perfected to the point of collecting the smoke in bags, as is since the custom. With the bright flash of light there developed a strong tonic contraction of the lids of both eyes, which very promptly gave way to continued clonic spasms. He was seen within forty-eight hours of the occurrence, and after a careful examination Dr. Hecht concluded that there was more of a psychic element than one of sensory local irritation, although the smoke might be regarded as such. A very powerful galvanic current was passed through the head by placing an electrode at each temple, producing a well-known sensation of a flash of light. This galvanic sensory impression, re-enforced by emphatic suggestion, caused an immediate cessation of the aggravated tic. and, after two more applications of successive days, permanent relief was had. Here was an instance in which the promptness of the remedy applied, together with some ingenuity in the plan of treatment, was conducive to a favorable result.

Dr. W. E. Gamble reported a case in this connection. A child, four years of age, developed blepharospasm after an attack of measles. All efforts to produce a cure were ineffectual. The mother of the child had a bottle of peppermint in the cupboard on the same shelf with a bottle of atropin. One morning the child got hold of the atropin bottle, drank some of its contents, and became thoroughly intoxicated with atropin. The necessary antidotes were administered, and the child recovered. The blepharospasm had subsided, and remained away for two weeks, and then returned. The child took violently ill with pneumonia, and the blepharospasm subsided and never returned.

Dr. William H. Wilder asked Dr. Hecht in regard to the differentiation of these cases of tic from blepharospasm. Sometimes it is quite difficult to say whether there is any lesion in the eye that might excite blepharospasm. Sometimes such cases seem to be excited by retinal hyperemia, manifested by peculiar granular appearance of the pigment layer of the retina around the yellow spot. Such persons oftentimes have more or less photophobia, and often are persons to whom the electric light is very annoying. He has had one case in which he had to interdict the use of electric light for reading, because of its influence on the retina. These cases are more marked when caused by a very strong flash, such as is seen when a strong current is suddenly grounded. He has seen cases where such a flash has caused both conjunctival and retinal hyperemia. The men who get that way are put to work to blow out a plug which resists the ordinary mechanical means of blowing out. The face must be protetced with a very dark glass to avoid burning. These men will often have a blepharospasm follow on the retinal hyperemia, so that it is difficult to differentiate between the tic and the blepharospasm caused by some demonstrable lesion.

Dr. Hecht said that it was perhaps not wholly essential that the sensory irritation be demonstrated, since, to his way of thinking, anything that would induce a hyperesthesia in the ocular apparatus could be regarded as sufficiently irritant and unpleasant. If it were enough to cause involuntary tonic or clonic contraction of the eyelid, it, properly speaking, would be a spasm. Necessary for its continuance would be a psychoneurotic element, and with the former removed, but the latter remaining, the premises were favorable for the superimposed tic; in other words, in all or nearly all of the cases that develop tic there is a substratum of physic or neuropsychic instability which must be sought for and recognized. Given the same amount of sensory irritation in a normal individual, a tic would not be expected to supervene.

Dr. Wilder asked whether neurologists entertained the idea that autointoxication plays any role at all in producing these habit spasms.

Dr. Hecht said that so far as the curability of tics is concerned, it has been clearly demonstrated that it is a matter of stimulating in patients a better capacity for motor discipline and persistent efforts at re-education. Tics do get well, even after they have been chronic. He has had occasion to treat several apparently intractable eyelid tics by keeping patients in a darkened room, with the instruction to rhythmically half open and close the eye, while following this manoeuver intently by looking into a looking-glass and persisting in it for one hundred counts. Many modifications of these procedures may be instituted, and considerable ingenuity applied in this educational method of treatment. It may take many months to bring about improvement, and then again, with the slightest provocation, there may be recurrences, but in spite of these handicaps not all cases that are chronic and discouraging should be looked upon as incurable.

Dr. Remmen said that in one case he corrected the refraction error and encouraged the family not to refer to the patient's trouble. The patient recovered. The tic in this case consisted of a little jerking of the eyelids, a twitching. He believes that a blepharospasm is a very much more violent affair than the ordinary tic.

Improved Shell for Tenon's Capsule.

Dr. George F. Suker exhibited a shell that is a substitute for the shell usually used after a Mule's operation. It is enclosed in the capsule of Tenon, and gives a large stump for an artificial eye. The shell is an almond-shaped glass globe. It causes no irritation, and permits of free lateral movement of the artificial eye.

Dr. Oscar Dodd has had the trouble of not having an artificial eye fit properly over the ordinary sphere. Motion is suspended or imperfect. He thought that Dr. Suker's shell would probably obviate that difficulty.

Dr. Suker emphasized the necessity of perfect asepsis. The conjunctival sac must be absolutely free from discharge, more so than in a cataract extraction. Since using this modified sphere, he has had less difficulty in fitting an artificial eye, and better results with regard to motion.

Willis O. Nance, Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Joint meeting with Colorado Oto-Laryngological Society, in Colorado Springs, January 16, 1909. Dr. Alexander G. Magruder, presiding.

Diseases of the Accessory Sinuses in Relation to the Orbit.

Dr. Melville Black reported at length three cases in which he had found direct connection between ocular and accessory sinus diseases, with relief from sinus operations. He could recall no other cases occurring during the period of twenty years.

Drs. E. R. Neeper and A. R. Solenberger reported jointly the following cases: (1) Man of twenty-eight, with syphilitic infection eight years before, suffering from plastic iritis, which did not yield to active local and specific treatment until pus had been evacuated from the frontal and sphenoidal sinuses and the ethmoidal cells; (2) a woman, aged 53, suffering from weekly attacks of ocular pain, was relieved as to frequency and severity of exacerbations (probably glaucomatous, as other eye was lost one year before from glaucoma) after removal of the anterior two-thirds of a much hypertrophied middle turbinal and cauterization of an intumescent inferior turbinal; (3) a woman of twenty-eight, a great sufferer for many years from migraine, was greatly relieved by application of the galvano-cautery to spongy inferior and middle turbinates; (4) a child who had suffered for five months with most painful double interstitial keratitis, was not relieved by local treatment until hypertrophied inferior turbinate, tonsils and adenoids had been removed (the subsequent development of an abscess of the caruncle being incidental); (5) a man of fifty-five, with chronic conjunctivitis and entropion, was benefited by operative relief from occlusion of one nostril.

Drs. A. C. H. Friedmann and A. R. Solenberger jointly reported a case of chronic dacryocystitis, which resisted the usual treatment. A markedly deflected septum was straightened, a middle turbinate removed, and ethmoidal cells curetted; after which the dacryocystitis was cured by a few treatments.

Dr. Robert Levy said that the close anatomical relation between the accessory sinuses and eye often explained obscure ocular lesions, and thought that we were coming to a better understanding of the pathological connection between the two. He pointed out that frank symptoms of ethmoidal and sphenoidal disease, as purulent nasal discharge, are often absent in eye diseases caused by affections of these cells; and would suspect the sphenoid in disturbances of the ocular muscles.

Dr. F. R. Spencer reported the relief of edema of the eyelids and orbital cellulitis by operation for purulent double frontal sinusitis.

Dr. Solenberger showed a sphenoid bone with very thin walls.

Dr. E. T. Boyd reported great proptosis, with immobility of the eye. An incision outside the external rectus and into the orbit revealed pus. Patient died the following day. The antrum and anterior cells of the ethmoid were found full of pus.

Dr. Orendorf reported a case of diplopia associated with pus in the posterior cells. He thought that many cases of diplopia, with remitting symptoms which later became permanent, were probably due to sphenoidal disease.

Dr. J. R. Robinson reported a typical case of orbital cellulitis; but on incision found no pus, but only bare bone. On removing the middle turbinal he obtained a free purulent discharge. The eye symptoms then subsided.

Dr. E. W. Stevens spoke of central scotoma as often due to sphenoiditis, and Dr. E. Jackson reported a case of this probable causation. Dr. Stevens had seen normal muscle balance with 10 mm. of proptosis.

Dr. J. A. Patterson stated that removal of the middle turbinate and examination of the ethmoidal cells often revealed a surprising amount of disease in this location, in cases of obscure ocular inflammation.

Dr. Jackson considered osteoma of the orbit a salient feature, and advised early removal of osteomata of considerable size.

Dr. C. E. Cooper thought that the frequently observed sinus affections would seem to cause more eye symptoms than they apparently do.

Dr. Levy exhibited x-ray photographic lantern slides, illustrating affections of the accessory sinuses, and also pointed out clearly and comprehensively the connection between diseases of the sinuses and those of the orbit.

Resolutions were passed favoring a Colorado General Assembly bill, calling for physical examinations, especially of the eyes, ears and air passages, and proper care of school children of the State.

Separate meeting. Dr. A. C. H. Friedmann, presiding.

Peculiarly Shaped Corneal Opacity.

Dr. E. R. Neeper presented S. T. C. (see page 100, *Ophthalmic Record,* February, 1905). The corneal opacity showed much less of the bubble effect and occupied less of the corneal area than it did December 17, 1904. That which remained was more evenly, but not so densely, opaque, and had taken on somewhat the form of a shoe with upper and vamp each about 2 mm. wide and the toe pointing nasally and slightly downwards, the upper being about 3 mm. high and the vamp about 5 mm. long, while the superior nasal pupillary space, through which all vision was obtained, occupied the angle above the instep. A peculiar glistening surface somewhat resembling cholesterin deposits was seen along the lace line extending to the toe of the opacity. V. = fingers 12 ft.

Perimacular Degenerative Changes.

A woman, aged 45, was first seen by Dr. Neeper July 28, 1908, complaining of asthenopia, headache, frequent dizzy spells, photophobia, and with a history of some soreness of the throat and mucous patches, but nothing visible in her throat at that time. There had been no specific treatment. She had three healthy children, the oldest being aged 15 years. One child dead and one miscarriage. Improved after a month at Excelsior Springs, fall of 1908. Read J. 1 with either eye from eight to twenty-two inches. R. V. = 20/20 — with + .75 D. Cyl. Ax. 75° = 20/20 + L. V. = 20/30 with + .75 D. Cyl. Ax. 115° = 20/20 +. The ophthalmoscope showed perimacular degenerative patches.

Discussion.—Dr. Jackson thought this change was an old one, following previous inflammation, and that no further change would occur. Dr. Friedmann advised specific treatment.

Transparent Corneal Facet.

Dr. Neeper showed a creamery workman, aged 30, with sallow skin but good health, first seen September 13, 1908, with a deep pneumococcic corneal ulcer about 2½ mm. in diameter, situated 1 mm. from the limbus at the junction of the nasal and inferior quadrants. The ulcer was so deep that every precaution had to be taken to avoid perforation. The epithelium lined the concavity left by the ulcer, after six days' treatment. There was none of the usual scar tissue. The pit, with its transparent walls, had become less deep; but after four months still showed a distinct depression.

Retinitis Pigmentosa.

J. G., aged 13, healthy, had first been seen by Dr. Neeper December 26, 1901, for asthenopia, headache and night-blindness, and a diagnosis of probable retinitis pigmentosa was made. The disk margins were obscure, while small but not characteristic degenerative patches were noted in the periphery of the left fundus. There was no consanguinity. Three tests of the refraction were made under homatropin. R. V. = 20/80 — with correction = 20/60 — L. V. = 20/60 — with correction = 20/50. August 20, 1903: R. V. = 20/80 with correction = 20/40 L. V. = 20/40 with correction = 20/40+. December 21, 1908: R. V. = 20/30 with correction = 20/30 + L. V. = 20/50 with correction = 20/30 —. The degenerative changes had constantly increased, becoming characteristic throughout the periphery of both eyes. The fields had also contracted greatly during the past seven years. When presented the temporal fields remained nearly normal, but elsewhere they were, irregularly, from 20° to 30° for form, and small scotomata were present. Dr. Neeper also presented a woman, aged 55, with advanced retinitis pigmentosa. No consanguinity. Mother of four healthy children. Parents, four sisters and one brother, all healthy. Another brother, eight years younger, had retinitis pigmentosa and, like herself, had never been strong and rugged like the other members of the family. With correction, R. V. = 20/80 + L. V. = 4/160. The fields were greatly contracted.

Pannus Involving Lower Half of Corneas.

Dr. J. A. Patterson showed a man, aged 48, who had lived in Arkansas until a month before, where he had much malaria. Three years before he began having sore eyes, which became so bad that he had to be led about. A year before he had obtained a yellow and green ointment from an advertising quack in Ohio; after using it continually he eventually obtained much improvement. The lids showed no trachoma scars. There was, however, in both eyes a pannus covering the lower half of the cornea, with an addition of a central leucoma in the left eye.

In the right there was a bit of fleshy pannus almost like a pterygium. After separating this from the globe, up to the limbus, by a subconjunctival injection of normal salt solution, it was dissected from the cornea by a sharp Graefe knife, and the denuded corneal area touched gently with a 25% solution of nitric acid. Vision had been better since that time, as the reattachment of the vessels did not approach so far upon the cornea as before. Dionin was being used. Dr. Patterson considered this condition of trachomatous origin.

Discussion.—Dr. Neeper thought this a case of trachoma. Dr. Black believed it chronic sclero-keratitis, and would do a peridectomy and curettement of the scleral margin. Dr. Strickler would use x-rays: and Dr. Bane mercurol powder or ointment. Dr. Coover considered it trachoma, and noted granules below and a few at the upper fornix. He stated that he had often seen corneal lesions in follicular trachoma, and advised examination by turning the lids back two or three times with Darier's forceps, and inspection by aid of a binocular loupe.

Ciliary Wound with Scleral Counter-Puncture.

A woman, aged 40, presented by Dr. Patterson, was brought to his office on January 2, 1909, having been struck by a person with a hatpin held so that it protruded but a short distance from the hand. Both upper and lower lids were bruised and swollen. There was a silghtly ragged wound at the outer margin of the cornea. A large amount of iris was protruding through the upper 2/3 of the rent, which was of a soft pink color. There was a counter-puncture in the sclera about 3 mm. from the limbus, and a trifle higher than the upper edge of the corneal wound. The margin of the corneal wound, for 2 mm., was hazy and wrinkled. The media were otherwise clear enough to show a slightly vertical oval nerve. No hemorrhage in the vitreous. On the afternoon of the same day, under cocain and holocain, the iris was drawn out gently and cut off. There remained a cut in the portion of the iris replaced. Atropin was applied and the patient put to bed.

The eye had been dressed daily. The anterior chamber was restored in twenty-four hours. No reaction having followed by the seventh day following, permission was given to go home on the following day; but that night she was kept awake by pain in the eye and the ball was tender in the region of the counter-puncture. This pain was entirely relieved by aspirin, which produced profuse sweating. The next day divided doses of calomel, followed by salts, were given. As lacrimation without photophobia continued aspirin was resumed on January 13, with the effect of lessening the lacrimation.

Discussion.—Drs. Black and Friedmann thought the prognosis good.

Vernal Conjunctivitis.

Dr. E. M. Marbourg presented a boy with vernal conjunctivitis of eight years' standing, affecting the ocular but not the palpebral conjunctiva, and causing slight clouding of the cornea. He had used 4% ichthyol in boric acid solution.

Discussion.—Three to 4% salicylic acid ointment was suggested by Dr. Coover, who mentioned Theobald's use of 3 grains of sodium chloride in 1 ounce of 1:8000 solution of mercuric chloride.

Cases Reported.

Dr. Black reported central scotoma of one eye. He stopped the use of tobacco and gave strychnia. Vision returned in one week.

Dr. Neeper reported coffee amblyopia, with fainting, following excessive use of coffee in one not accustomed to drinking it. Some improvement had followed abandonment of coffee drinking. He also presented a case of amblyopia, probably toxemic, with a patch of chorioidal atrophy below the macula.

Dr. Bane reported retrobulbar optic neuritis, with central scotoma, in a man aged 42. The origin was not well defined. Treatment by the high frequency current was followed by marked improvement.

Dr. J. R. Robinson presented a case of chorioiditis, and Dr. A. C. Magruder showed (1) anisocoria, with alternating squint, and (2) lateral and rotary nystagmus.

Meeting of February 20, 1909, in Denver. Dr. David A. Strickler, presiding.

Hyalitis.

Dr. W. A. Sedwick presented a man of thirty-one, with a history of dark spots having occasionally appeared before the left eye for eleven years past, and an attack of la grippe each winter. One child was tubercular, a brother's lenses were cataractous at the age of 27 years, and the patient was a health-seeker in Colorado. Previous treatment for the opacities, probably with K. I., had been of no benefit. The right eye was normal. The vision of the left eye varied quickly from 20/30 to 20/80, up and down, and transient hemiopia occurred. At times a gauzy film had appeared before the left eye, without pain or inflammation; followed by dark spots and floating bodies, with reduction of vision to objects of considerable size a few feet away. Vision had always returned, as above, after these attacks. The ophthalmoscope revealed a very hazy vitreous, with many floating bodies of various sizes.

Discussion.—Dr. Hess suggested soda cinnamate injections.

Drs. Coover and Davis advised tuberculin.

Dr. Chase would use mercury if not tuberculin.

Drs. Ringle and Patterson would examine the accessory nasal sinuses carefully.

Dr. Black would guard the general health, considering tuberculosis probable.

Dr. Jackson said that the vitreous opacities, probably caused by hemorrhage, would account for the changeable vision; and that the half-vision could be explained by a posterior opaque mass swinging over one-half of the macula. He thought the case possibly tubercular.

Dr. Libby thought the sudden and not transient losses of sight were due to fresh hemorrhages into the vitreous. He recalled a case of hyalitis, with anterior fixed opacities in both eyes and floating masses in one vitreous body, closely following an attack of la grippe in a young woman known to have had a normal fundus and clear media except a few dots of peripheral opacity in each lens.

Hemorrhagic Retinitis.

Dr. D. A. Strickler showed a woman, aged 70, who had first come for examination April 20, 1908, complaining of dimness of vision and occasional pain after taxing the eyes. R. V. = 20/40, L. V. = 20/30 —, with correction. There was a small central lenticular opacity, with normal fundus, in each eye. August 26th, R. V. = 20/40 +. On February 10, 1909, the patient noticed reduction of vision in the right eye, to light perception; but no change in the sight of the left eye. The fundus showed marked retinitis, tortuous vessels, and numerous small, fresh hemorrhages scattered over the retina. The arterial tension was 200 mm. Chemical and microscopical examination of the urine had been negative.

Discussion.—Dr. Patterson recalled albuminuria in a patient of about fifty-five, with tortuous retinal vessels; one eye presenting hyperemia of the optic disk, the other profuse retinal hemorrhages.

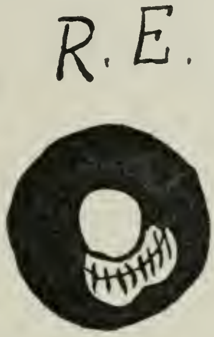
Dr. Black would endeavor to reduce the blood pressure and keep it down by nitrate of soda, intestinal elimination, cereal and vegetable diet; and recalled a case in which the blood pressure had been brought from 240 to 160 mm. in three months and the heart action restored to normal, while spinach was the sole article of diet. He also spoke of a woman who had lost one eye from hemorrhagic glaucoma. Later, vitreous hemorrhages followed a drop in pressure from 160 to 110 mm. Under digitalis, strophanthus, nux vomica and a stimulating diet the pressure returned to 130 or 140 mm., and the hemorrhages ceased.

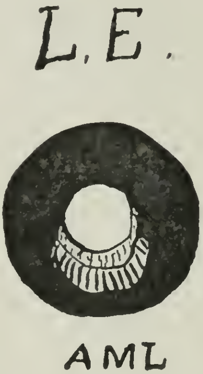
Old Socket Injury.

Dr. D. H. Coover presented a man of 32, with socket injury of 20 years' duration, and loss of part of the orbital margin. The upper lid was attached to the periosteum, above, and the lower lid was everted. The stump of the eye was *in situ*. Dr. Coover asked for suggestions as to making a socket for an artificial eye; which were given.

Binocular Localized Atrophy of the Iris.

Dr. Coover also showed a man with atrophy of each iris, occupying a space concentric with the lower margin of each pupil, extending back about 2½ mm. from the pupil and 6 to 8 mm. laterally. The iris vessels, stroma, pigment cells and most of the sphincter were gone. The radiating, but few of the circular fibers, showed. The iris reacted to light elsewhere, but not in the atrophic part. A hyper-mature cataract showed through the atrophic iris in one eye. There was no history of injury or inflammation in either eye.





Discussion.—Dr. Black thought the absence of blood vessels was congenital, and the lens opacity probably so. In removing the cataract he would make incision below, take out part of atrophied iris, and have it examined microscopically.

Dr. Davis thought the eye was quiet and the lens cataract-out from lack of nutrition.

Dr. Jackson had seen several cases of atrophy of the iris; some after injury, others following iritis. He referred to Dr. Casey Wood's case of spontaneous absorption of the iris, and his own published case of exfoliation of the anterior layer of each iris. He thought there was probably some congenital binocular defect in Dr. Coover's case; that the absence of vessels suggested vascular disease as the causation, and that the iris was probably adherent to the lens-capsule below.

Note.—Dr. Coover later removed the cataract, making the incision above and doing a small iridectomy. Through the atrophied segment of iris below and the operative coloboma above, the usual black appearance of the fundus showed to the unaided eye. Most of the cortex was liquid and the nucleus firm, the cataract being of the congenital type.

Blindness from Gastric Hemorrhage.

Dr. J. A. Patterson reported two very recent enormous hemorrhages from the stomach, in a period of four days, following indigestion, in a man of about thirty-two, with history of syphilis. Vision had been lost after the first hemorrhage. When seen by Dr. Patterson, six days after the first bleeding, both disks were pale, the retinal vessels were seen through a haze, and there was central scotoma. Salt infusions proved of no benefit on the seventh day, but nitrate of amyl given on the eleventh day seemed to improve vision somewhat; but the mind remained dull.

Central Retinitis with Scar Tissue.

Dr. Edward Jackson reported a boy supposed to have had good vision until 12 years old. After an attack of measles he had very soon taken up his studies, without the aid of glasses. Vision then failed. When seen, later, by Dr. Jackson, there was an area around each fovea of 1/4 disk diameter, and as white as the nerve head. It was smooth, had fine vessels, and looked like a "hole in the macula," except for the absence of pigment margins; but the surface was level with the adjoining fundus. The horizontal oval of the macula showed radiating reflexes. V. = 4/20. With the correction of 0.5 D. astigmatism in one eye, 1.00 D. in other, and 3.50 D. hyperopia in both: R. V. = 4/12, L. V. = 4/15 mostly.

Sclero-Keratitis.

Dr. Melville Black reported a case of sclero-keratitis with lacrimal obstruction, treated about 12 years ago. There had been some recurrences in the first three years, but none after that. Now, believing the ocular disturbance of tubercular origin, he had lately administered tuberculin. Reaction followed, and so the patient was put under tuberculin treatment.

Dendritic Ulcer with Herpes Facialis.

Dr. E. W. Stevens reported very numerous herpetic blebs on the lips, following a chill and other grippe symptoms, in a patient of forty-five. Dendritic corneal ulcers appeared twenty-four hours later. He also recalled a very stubborn case of the same character, previously reported to this society, in which nitric acid was the most effective of the many remedies applied to the ulcers. Neither patient was malarial.

Discussion.—Dr. Davis suggested the galvanocautery for the dots or lines of ulceration.

Cases Previously Reported.

Dr. Bane stated that gradual restoration of vision to 20/20 had occurred in his case of central scotoma, reported at the January meeting.

Dr. Patterson reported marked improvement in the pannus, under applications of citrate of copper, in a case which he showed at the last meeting.

Dr. Ringle reported complete absorption of the lens in the case of traumatic cataract presented by him at the December (1908) meeting. Needling of remaining capsule had been followed by cloudy aqueous; which soon cleared, the resulting vision being 20/30 with a 12.00 D spherical lens.

Tenth anniversary. Meeting of March 20, 1909, in Denver. Dr. Melville Black, presiding.

Traumatic Cyclitis.

Dr. G. H. Strader presented a man whose right eye had been injured six weeks before, by flying particles from a breaking rawhide whip. The eye soon became red, but pain was not felt until six days later. Iritis, with posterior synechiae, developed. The patient then sought medical relief. A piece of rawhide ¼ inch long and several bits of copper wire from the inside of the whip were recovered from the conjunctival cul-de-sacs. Large doses of sodium salicylate were given, and atropin and dionin instilled. Vision had risen from light perception to 4/30. Tension normal or slightly lowered. X-ray, magnet and transillumination revealed no foreign body in the globe.

Discussion.—Drs. Jackson and Libby noted haziness in the vitreous, with some moving bodies, and a scratch (not scar of perforation) on the cornea near and crossing the limbus; and thought the disturbance was cyclitis, due to traumatism, rather than foreign body within the eyeball.

Congenital Absence of Superior and Inferior Recti.

Dr. D. H. Coover showed a woman with absence of these muscles, as shown by operation for advancement of seemingly paralyzed muscles. He had reported this case to the Society at the October (1908) meeting. The question was raised of tenotomizing and re-attaching the external rectus for inward and upward squint, with diplopia.

Discussion.—Dr. Jackson favored this operation for relief of the squint, but not with much hope of benefiting a congenital diplopia.

Dr. Neeper thought the cosmetic effect would not be improved by operation; neither would he remove the eye, as it had vision of 10/200.

Paresis of External Recti.

Dr. Black presented a girl of 14 years, who had menstruated regularly for one year. For the past six months she had noticed a gradually increasing diplopia, with dull constant fronto-occipital headache. R. V. = 20/40 with + 2.00 + 0.50 cyl. ax. 90° L. V. = 20/20 with + 1.00 + 0.50 cyl. ax. 90°. There was paresis of both externi, with an esotropia of 45°. The fundus showed pronounced venous engorgement in each eye.

Extensive Lacerations of Eyelids.

Dr. D. A. Strickler showed a man who had fallen from a wagon, striking his head on sandy ground, twelve days before, badly lacerating the forehead, cheek and both lids. The upper lid was torn from outer to inner canthus, about ½ inch from the ciliary border; with a second cut, penetrating the lid, from the ciliary margin to the longitudinal laceration. The lower lid was also torn longitudinally for half its length. The cornea had not been injured and vision remained unimpaired. Some of the stitches had held, while others broke out because necessarily placed in necrotic tissue.

Cilio-Retinal Artery.

Dr. Jackson presented a patient in whose right eye a small artery could be seen arising from a chorioidal vessel visible at the temporal side of the disk, passing on the disk about one-eighth of its diameter, becoming more superficial and passing off to be distributed to the retina in the region of the macula.

Traumatic Dilatation of Pupil and Cycloplegia.

Dr. Jackson showed a boy of 15, whose right eye had been struck with the dart from an airgun, twelve weeks previously. When first seen, at the end of five weeks, the pupils were

R. 7 mm., L. 3.5 mm. Accommodation, R. 1. D., L. 10. D. Vision of 4/12 was brought up to 4/4 partly by + 0.75 s. ○ + 0.75 cyl. Under pilocarpin the pupil contracted to 3.5 mm. Now, without a myotic, the pupils were R. 5 mm., L. 4 mm., and the accommodation had risen to 7. D.

Discussion.—Dr. Stevens recalled a brakeman struck in the eye by a flying nail, causing a corneal abrasion and complete ciliary paralysis. Under eserin the accommodation returned to normal, but the pupil would not respond to light or convergence. He also spoke of widely dilated pupil and vision reduced to light perception, following a blow on the eye from a cork. Later, the sight had returned; but the pupil remained enlarged, which was likely to be permanent.

Dr. Sisson related a case of complete paralysis of the accommodation caused by a blow from a snow ball, with depreciated vision. The sight improved slightly, but the paralysis remained.

Episcleritis.

Dr. G. F. Libby presented a woman of thirty in whom he had lately observed episcleritis closely follow mild iritis. This eye had been slightly inflamed two or three times a year, in the past five years; and had promptly cleared up each time under sodium salicylate. The exhibition of this drug, preceded by calomel and followed by potassium iodide, together with atropin locally, was not giving satisfactory results. No specific or tubercular history or present manifestation was ascertained.

Discussion.—Drs. Friedmann and Coover considered it a case of phlyctenular conjunctivitis, while Dr. Jackson believed it to be episcleritis.

Dr. Black advised further search for tuberculosis.

Dr. Bane would give protoiodide of mercury. Dr. Hess sodium cinnamate, and Dr. Conant would use massage over the scleral swelling.

Minute Retinal Change with Corresponding Scotoma.

Dr. Libby also showed a woman of thirty-four., with a history of a blow over the middle of the left eyebrow, one month previous. R. V. = 4/3 mostly, L. V. = 4/6; each with or without correction. The right pupil was 2½ mm. at rest, 6½ mm. under 1% homatropin. The left was 3 and 6 mm., respectively, under the same conditions. The ophthalmoscope revealed a faint pigmented ring about ½ disk diameter in size, enclosing retina of a hazy, skimmed milk appearance, which was crossed by a tiny Y-shaped vessel, and situated about ½ d.d. upwards and inwards from the macula. A distinct scotoma could be mapped on meridian 155°, four degrees from the center of fixation and two degrees in width; vision in the scotomatous area being about 4/30. As the anisocoria and the scotoma had been noticed by the patient nine years before, when her first glasses were fitted, and as the retinal changes were evidently old, it was believed that the recent traumatism was merely a coincidence and had caused no ocular injury.

The Society further observed its anniversary by a dinner at the University Club, arranged by Drs. Coover and Black, charter members.

Dr. Edward Jackson, founder of the Society, gave an address, entitled "The Local Ophthalmological Society." He recalled the first meeting, March 17, 1899, its growth from five charter members to a membership of twenty-five, the average attendance of nearly 70%, the regular appearance of its transactions in three American ophthalmic journals, and abstracts of the same in European journals. He considered that the really great work of this society consisted in the influence of these meetings upon the members as to their method of study, habits of reading and observation, ways of handling cases, judgments of their colleagues at home and abroad, and their loyalty to professional ideals and to the science of humanity.

Dr. Jackson suggested that an effort be made to impress upon fellow workers elsewhere the great good they are missing through lack of a local ophthalmological society. Denver was the fifth city in the United States to have an ophthalmic society, though the twentieth in population (about 100,000) at that time. His experience with the difficulties attendant upon the formation of the Section on Ophthalmology of the College of Physicians of Philadelphia, encouraged Dr. Jackson to attempt an ophthalmic society for Denver. He referred to the way in which the local society had aided in making the visits of distinguished guests, as Professors Hirschberg and Hess, of Germany, pleasanter for them and of greater advantage to all the members of the society.

Dr. Jackson pointed out that one should learn from inferiors as well as superiors, and gave his conception of intellectual development as follows: "Intellect is a product of contact; contact of some kind, the written page, the spoken word, the intonation, the expression of face, the inherited results of an infinite number of contacts on the part of ancestors. * * * It is this getting out of ourselves, seeing things with other eyes, that is the essential of intellectual growth."

Dr. E. W. Stevens, the first Secretary of the Society, inaugurated the custom of sending reports of the transactions to an ophthalmic journal. He called attention to the fact that many questions of public policy as well as health matters pending before State legislatures and Congress, had orginated and were being pushed by medical men.

Dr. W. C. Bane, another charter member, spoke of the help this Society had been to him, and made some interesting reminiscences.

Dr. John Chase said that he had never attended a meeting but that he was led to read up, afterwards, some points touched upon.

Dr. E. O. Sisson, the newest member, told of the advantages of the Society to him.

Meeting of April 17, 1909, in Denver. Dr. E. R. Conant, presiding.

Cyst of Anterior Chamber.

Dr. E. Jackson presented a man, aged 21, who before he was two years old had his left eye struck with a fork. There was a flat scar at the upper corneal margin, with anterior synechia. From it an almost circular, translucent, light brownish-gray cyst 4.5 mm. in diameter extended downward into the anterior chamber, having the appearance of a lens nucleus. At its lower margin was a yellowish line looking like sediment. There was high astigmia in both, but higher in the other eye; and the patient had always considered this his better eye. Vision: R. = 1/25, L. = 4/10. With correcting lenses, worn three weeks, he had V. = 4/4 each. There was no sign of irritation, and no increased tension. No interference was advised unless the cyst grew or caused some disturbance.

Discussion.—Dr. Stevens considered this an implantation cyst, epithelium having been carried in by traumatism.

Dr. Walker related a case of iris cyst which he had observed. He noted that the stroma had separated and fluid formed within.

Traumatic Incision of Cornea.

Dr. W. C. Bane showed a boy who had been struck on the left eyeball by a falling icicle, twenty-four days before. An A-shaped incision of the cornea, 2x3 mm., resulted at the lower limbus, with iris prolapse. Although seen at once, the prolapse could not be replaced; so it was cut off. Under atropin, trikresol and vaselin (1:500), and bandage prompt healing occurred without pain or photophobia. The ophthalmometer showed astigmatism of 1.25 D. axis 105° — 15°. L. V. = 4/10 c. — 1.25 cyl. ax. 15° = 4/4.

Corneal Staphyloma.

Dr. C. E. Walker presented a case that had consulted him last autumn because of an infected ulcer of the cornea, 2.5 mm. in diameter and to the nasal side of the pupil. This was curetted at once, and argyrol baths and hot applications ordered. On the following day the ulcer involved the entire cornea. Paracentesis was then done by Paquelin's cautery. The final result was a staphyloma involving all the cornea except a narrow peripheral ring.

Discussion.—Drs. Jackson and Patterson suggested the lower part of the corneal periphery as the place of choice for paracentesis, and would open the anterior chamber for pain.

Drs. Neeper and Patterson had curetted and cauterized a bad central ulcer in the only good eye of a patient, with quick recovery. Later, good peripheral vision followed iridectomy.

Dr. Black thought the actual cautery should be abandoned in favor of the caustic applications of carbolic, nitric or trichloracetic acids, followed by 25% argyrol every two hours. He also said that vaccine therapy would save more eyes in the future; and reported a case of phlegmonous dacryocystitis of an erysipelatous character in which the use of streptococcus vaccine had been followed by cure of the lacrimal disturbance and a profuse nasal discharge.

Dr. Stevens said that the structure of the cornea makes even pinhead ulcers serious, and that in future the question of treatment would be decided bacteriologically. He thought the pneumococcus ulcer was best treated by curetting, cutting off its edge, and touching with nitric acid; and recommended bichloride of mercury and iodoform in vaseline as a good dressing for infected ulcers. Dr. Stevens said that immunity was a slow process, and that vaccine was best for chronic cases, and of no benefit in acute infectious cases. He suggested a trial of vaccine in chronic dacryocystitis.

Gunshot Wound of Eyeball.

Dr. E. W. Stevens presented a man, aged 42 years, who had been struck in the left eye, two days before, by a No. 6 birdshot. The patient was 145 yards from the gun, and the shot had ricocheted from the surface of a duck lake before hitting him.

The shot penetrated the upper lid about 4 mm. above its central margin, and entered the bulbar conjunctiva 8 mm. from the corneal margin, in the vertical plane. When first seen, two hours after the injury, there was general subconjunctival hemorrhage, and the ophthalmoscopic examination showed hemorrhage in the upper half of the vitreous, the lower half being perfectly clear. T. — 2.

Dr. C. H. Stover, to whom the patient was sent for an x-ray examination, located the shot 20 mm. back of the center of the cornea, 16.5 mm. above the horizontal plane and 7 mm. to the nasal side of the vertical plane. This placed the shot outside of the eyeball. The treatment was atropin and bandage.

Discussion.—Dr. Libby related a case of lodgment of a small fragment of steel in the posterior part of the orbit, as shown by an x-ray photograph. The projectile entered just above the inner canthus, without injury to the eyeball or its adnexa. No injury was ascertainable five years later.

Dr. Neeper reported the entrance of a shot through the lower lid, grooving the sclera, but not puncturing it, and entering the brain. The anterior chamber had filled with blood, and some hemorrhage occurred in the vitreous. The eye was sore and some impairment of motion followed the accident. Subsequently the hemorrhages absorbed, the eye got well, and no injury resulted to the brain.

Irido-Cyclitis.

Dr. E. R. Conant showed a man of forty-seven, with history of recurring ocular inflammation since 1882. The right eye showed a cloudy cornea, a discolored iris firmly bound down to the lens capsule, a hazy vitreous, with vision = 12/200. Immensely hypertrophied middle turbinates had just been removed. There was no history of rheumatism or syphilis. Treatment: atropin and dionin.

Discussion.—Dr. Bane would give mercury by inunction.

Dr. Black said that cases of uveitis with vitreous opacities did badly.

Conjunctival Burn and Traumatic Cataract.

Dr. Conant also presented a man, aged 42 years, who had experienced a peppering of the entire right side of the body from the explosion of a hundred dynamite caps, 23 days before. The skin about the right eye was injured, but not the globe. The conjunctiva of the left eye was burned, and the lens became cataractous in a few hours. On first examination, April 16, 1909, cortical matter was seen in the anterior chamber. R. V. = 25/40 — L. V. = light perception. Small white particles embedded in each cornea were then removed. R. media clear, except corneal scars, and fundus normal. Atropin and dionin were ordered, with holocain if necessary.

Discussion.—Drs. Bane and Walker thought the cataract was probably the result of perforation of the lens capsule rather than concussion.

Monocular Acute Trachoma.

Dr. Melville Black presented a drug clerk, who had suffered from inflammation of his right eye for a month. When first seen, a week before, there was some question as to diagnosis. The eye then had many signs of keratitis profunda, also many symptoms of acute trachoma. The trachomatous nature of the process had, however, now become positive. Dr. Black had rubbed the lids with boric acid powder and applied glycerole of copper solution.

Discussion.—Dr. Patterson advised argyrol, and thought the monocular manifestation suggested bacterial infection.

Dr. Hilliard would apply 2% silver nitrate to everted lids, neutralizing the excess with sodium chloride, and also use 3% dionin.

Dr. Bane would use copper rather than silver, with the epithelium broken.

Dr. Walker used silver nitrate only when discharge was present.

Dr. Neeper suggested 1% ichthyol in olive oil or vaseline, and would also use nitrate of silver and dionin.

Dr. Strader had been using 2% dionin and ½% antipyrin for corneal herpes, and had found this strength of antipyrin of benefit with irritating collyria.

Dr. Black had found 2% silver nitrate beneficial in marginal blepharitis of children.

Nasal Treatment of Cyclitis.

Dr. C. H. Strader reported removal of anterior end of hypertrophied middle turbinal and curettement of anterior ethmoidal cells, liberating pus, in case of traumatic cyclitis, presented by him at the last meeting. The eye cleared up, photophobia disappearing and vision rising from 4/30 to 20/70 in ten days in spite of a severe attack of la grippe. Later, vision became 20/40. Sixty grains of aspirin had been given once, and dionin and heat had been used, since the nasal operation.

Snow Blindness.

Dr. Strader also reported snow blindness on a *cloudy* day, following a 25-mile ride in the wind. A narrow band of cornea, corresponding to the palpebral aperture, stained with fluorescin the second day, but not the first.

Election of Officers.

Drs. G. F. Libby and Melville Black were re-elected Secretary and Treasurer, respectively. Dr. Charles E. Walker was elected Chairman of the Executive Committee, the Secretary and Treasurer being the other members, ex-officiis.

George F. Libby, Secretary.

OPHTHALMIC SECTION.
ST. LOUIS MEDICAL SOCIETY.

Meeting, December 9, 1908. Dr. A. E. Ewing, presiding.

Gunshot Wound of the Eyeball.

(Dr. John Green, Jr.)

J. E. C., 32 years, was shot in the left eye at 11:30 a. m., October 25, 1908. The shotgun was discharged to the right of and about twenty-five yards from the patient, and at an angle of about 30° with the plane of his body. Vision was immediately abolished. He was seen by a physician, who applied a moist antiseptic dressing, and directed him to consult an oculist at once. Two hours after the accident, or at 1:30 p. m., Mr. G. came under my observation. I found a punctured wound of the lower lid at about its middle third, the point of emergence on the inner side of the lid being 5 mm. farther to the left than the point of entrance. 5 mm. down and out from the corneal limbus was a small penetrating wound of the sclera. R. V. 18/12, L. V. hand motions at 6 inches. The pupil dilated moderately well under atropin, but was flattened at the outer, lower margin.

The ophthalmoscope revealed a large blood clot in the lower part of the vitreous. Fundus reflex discernible up and in. A small doubly refracting spherule (bubble of air?) could be seen just above the upper border of the blood clot. At 6 p. m. the same evening an x-ray localization was made in Dr. Carmen's office. This picture indicated that the shot had perforated the sclera posteriorly and lodged in the orbital tissue 2.5 to 3 mm. behind the eye. Treatment consisted of hot saline irrigation, 10% argyrol, and atropia. Internally, calomel and saline purge.

October 27, eye quiet, pupil well dilated and circular, V. 1/15 R. potassium iodide gtts. X increasing t.i.d. October 30, V. counts fingers at 8 feet. Opthalmoscope showed much dimmer reflex from the upper part of the fundus. November 1, the patient had a severe pain in the eye, lasting about five hours. The ophthalmoscope showed a fresh mass of blood lying on top of the original clot. V., hand motion at 3 feet. Dionin 5%, later 10% ordered.

On November 10, at the suggestion of Dr. W. Nobbe, who saw the patient in consultation, he was given a pilocarpin sweat, which was repeated on the following day. Diaphoresis was not satisfactory on either occasion. November 11, a second x-ray localization was made by Dr. Carmen, which indicated that the shot was contiguous to the globe, perhaps actually attached to the sclera. A third localization, November 20, gave results identical with that of the second. The case, then, is a border line one, in which it is difficult to state whether the shot is in or outside the sclera. In order to secure further light on this question, another plate was exposed in the following manner: One-half of the plate was exposed with the patient directing his eyes upward, the other half with the patient directing his eyes downward. This picture shows very clearly that the shot has moved from the position it occupied when the eyes were directed up, to an entirely different position when the eyes were directed down. Furthermore (the shot having been slightly flattened by its passage through the tissue), it is possible to discern that the direction of the axis of the shot is not the same in the two positions. The shot was apparently moved along a great circle of the spherical globe and the axes of the shot represent tangents to the circle at the first and second positions.

It should be borne in mind that the patient is a man of large frame and may possess an eyeball 1 or 2 mm. longer in the antero-posterior axis than the average eye (which is represented in the localizing diagram). As the fellow eye is slightly hyperopic (1D.), it is not likely that there exists any axial elongation incident to myopia.

At present time V. = p. 1. (candle flame at 2 m.). Projection is defective.

Discussion.—Dr. Meyer Wiener, at a previous meeting, had presented some plates of a patient who had a foreign body in the eye similar to Dr. Green's case, in which it was doubtful whether the piece of steel was in the eye or had gone through. He had one picture taken with the patient's eye directed upward and one with the eye directed downward. He had used the Sweet localizer, and it was shown clearly that the foreign body was in the sclera. Since then he had had in mind a method for exactly localizing foreign bodies, which he had not yet had a chance to try, i. e., to use threads saturated with bismuth solution, placing them across the cornea in such a way that it would be impossible to measure the relative distance exactly. He did try, in this other case, sticking the point of a needle under the conjunctiva and taking a picture of this.

Dr. E. H. Higbee had seen a case in which the Sweet localizer was used, and when the picture was taken it showed the foreign body, a shot, to be outside of the eyeball. In reality, the shot was within the eyeball and was pressing against the sclera and bulged it up to such an extent that it gave the appearance in the picture of being on the outside.

Dr. J. E. Jennings referred to a case he had seen, the patient being a young man who was shot in the eye with birdshot. Dr. Wells made a localization and stated that the shot was 6 mm. back of the cornea on the temporal side, and 6 mm. below the median line, resting against the sclera. The shot was easily removed through a little button-hole flap of the sclera. In any case where there is any doubt about the position of the foreign body, and where there is no light perception, it seemed to him that the best thing to do would be to enucleate the eye and take no chances.

Use of Cycloplegics in Refraction.

(Dr. F. E. Woodruff.)

The writer believes the use of cycloplegics to be of great importance to both ophthalmologists and patients, and while the majority of ophthalmologists in this country use cycloplegics to a greater or less extent, there are some who claim to get better results without them. He admits that perhaps in many cases as good results can be obtained, but only with great loss of time and repeated visits to the oculist. He gives as his reasons for advocating the use of cycloplegics: 1st, hypermetropes, because of spasm of accommodation, frequently appear myopic and refuse to accept plus lenses, even after repeated trials; 2nd, hyperopic astigmatism sometimes appears to be myopic astigmatism; 3rd, in simple hypermetropia, correcting the manifest will relieve the symptoms for the time being, but they frequently return and one can never know, without a cycloplegic, what is the total hypermetropia; 4th, myopes, frequently accept, under a cycloplegic, a weaker glass than they select without one. Low grades of astigmatism, either with or against the rule, are more easily and accurately detected with a cycloplegic.

5th. There is less loss of time for the patient, for while the cycloplegic may take him from his usual vocation for two or three days, unless a cycloplegic is used, repeated visits to the oculist are necessary, and the amount of time lost is, in the aggregate, much greater. This is especially the case in patients at a distance, to whom a visit to the oculist means both hotel bills and railroad fare.

6th. The mydriatic effect of the cycloplegic enables one to examine, more thoroughly the periphery of the lens and fundus. Any difficulty in ascertaining the true refraction, owing to the enlarged pupil, can be overcome by the use of the stenopaic slit, which the writer considers of invaluable aid in refractive work.

He much prefers the shadow test to the ophthalmoscope as an objective method of determining the refraction; it being a very difficult matter for the operator, even after long practice, to entirely relax his accommodation. The shadow test, especially when used with a cycloplegic, being much more rapid and accurate, and greatly facilitates refraction, especially in routine hospital work.

The writer believes, however, that the trial case is the final resort in refraction, and that the findings at the trial case are the ones from which glasses must be prescribed. In patients under forty, he habitually uses a cycloplegic, unless there is some especial contra-indication, and when occasion seems to demand, he uses cycloplegics in even older patients. He believes that many times this custom facilitates the ordering of first reading glasses for presbyopes. Of course, in such cases one must be on guard against increasing tension and probable glaucoma. This danger is small, however, with homatropin.

Regarding the kind of cycloplegic, choice may be had between aqueous and oily solutions, tablets, and discs, of various medicaments, such as homatropin, scopolamin, atropin, etc. As a rule, the writer uses homatropin in solution in the strength of one grain to a drachm, instilling one drop at bed-time and repeating the instillation every ten or fifteen minutes for an hour the next morning.

In cases of strabismus, spasm of accommodation, astigmatism against the rule and mixed astigmatism, he believes atropin to be preferred. It is his custom in all cases, to determine thoroughly the manifest error of refraction, and the power of the recti muscles, and the relation between muscles of convergence and accommodation before using any cycloplegic.

Discussion.—Dr. A. E. Ewing had used cycloplegics early in his practice; it appealed to him as being an ideal method, but he soon found that it got him into a great deal of trouble. His patients were always returning with the complaint that their glasses did not fit, that they could not see through them, etc. He then took up the idea that the accommodation had a natural resting point, which could best be determined by means of trial lenses, and the skill of the physician consisted in finding this point of balance. With this determined, the patient would be comfortable. He adopted the method of putting on a glass somewhat too strong, or too convex in hypermetropic cases, and too weak, or less concave than necessary, in myopia, and permitting this to be worn for a few minutes until the accommodation became quiet, then adding weak, concave lenses until what seemed to be an acceptable equilibrium was established with vision as nearly normal as possible. He always had his patients report to him in the course of a few weeks and usually found the correction to be satisfactory.

Dr. F. L. Henderson said there were two points in refractive work that must be kept in mind, first, to determine the nature and the amount of error and then to prescribe the glasses that best overcame the symptoms caused by that error. It had always seemed to him that the medical profession took itself too seriously, individually and collectively. They were too much inclined to believe that if a thing was not done in their way, it was done wrong. If a physician found the glass that relieved the symptoms, it made no difference how he arrived at his conclusion. It seemed to him that it was unscientific never to use a cycloplegic. In his own work he endeavored to coax out as much relaxation of the ciliary muscles as possible. There being no contra-indication, he used a cycloplegic and got the static refraction. Then, after the cycloplegic effect had worn off, with his knowledge of the static refraction, he believed that he was better able to prescribe the glass needed than he would if he relied solely upon the manifest test. In the final test he applied a glass that he thought would relieve the patient of symptoms complained of, without following any set rule. The chief danger in the use of a cycloplegic was the possibility of the production of glaucoma. This was not a trifling thing, if it really did produce a glaucoma, but he had never yet seen glaucoma produced by a cycloplegic.

If, by the use of a cycloplegic, a latent glaucoma was unmasked, it was a question whether it was an injury or a benefit to the patient. Another objection that had been offered, was, it might dry up the milk of a nursing mother. He doubted whether so small an amount of the drug could produce such an effect. As to the use of a cycloplegic at the presbyopic age, he believed that it was of advantage in many cases of beginning presbyopia. He used homatropin in the majority of cases and atropin after homatropin in many cases, and, like Dr. Woodruff, had gotten pretty much the same static refraction. He had gotten very definite toxic symptoms from the use of scopolamin in two cases and had never used it since.

Dr. John Green, Jr., said the question of employment or non-employment of cycloplegic for the determination of errors of refraction is an immensely important one, and deserves the unbiased attention of every ophthalmologist. On this question oculists may be divided into three classes: first, those who rarely, practically never, refract an eye without paralyzing the accommodation; second, those who rarely, practically never, use cycloplegics; third, those who use cycloplegics when it seems unlikely that a satisfactory measurement can be made without them.

It is certainly true that the non-users of cycloplegics are few and far between, at least in this country. Every American text-book insists, in no uncertain way, that complete paralysis of the accommodation is absolutely essential to a correct estimation of the refraction. While there are no statistics available, roughly estimated, 80% of American ophthalmologists use cycloplegics as a routine, 15% use the method more or less frequently, and 5% only are definitely opposed to the method. While it may be possible that the many are wrong and the few right, still the burden of proof unquestionably lies with the few.

The non-users of cycloplegics contend that the eye cannot be compared to a mechanical optical instrument, because it is a living thing subject to the influence of the organism in which it is placed; that the moment we place an eye in an artificial condition (as with paralyzed accommodation) that moment do we, so to speak, isolate that eye from the rest of the organism, cutting off from it a thousand and one influences which may modify its refractive and accommodative functions. They point to the fact that the widely dilated pupil permits the entrance of extra-pupillary rays through a portion of the cornea whose refraction may be widely different from that of the central portion. They insist that a careful study of the refractive condition the "natural" eye should be made the basis of a prescription for glasses. In a word, they endeavor, by painstaking subjective methods, in which astigmatic charts and the ophthalmometer play an important role, to arrive at a correction, which at the moment is acceptable and comfortable to the patient. They do not expect the correction given will be the final one, but insist on re-examination from time to time, with a view of unmasking more and more of the latent error. Thus in the majority of cases, the patient, for the time being, is relieved of his symptoms, and should they recur, can again be made comfortable by a slight change in the spherical and cylindrical element.

It must be confessed that this method is trying to both the patience of the examiner and the examined. The laborious efforts of the oculist to unmask, by the fogging method, as much of the latent error as possible, seem utterly futile to the latter-day skiascopist, who, with a few flashes of his mirror determines, with great accuracy, the static refraction of the eye. The conspicuous merit of the non-cycloplegic method lies in the opportunity it affords for a study of the function of the "natural" eye under the influence of the vital activities of the individual. What is one man's meat is another man's poison, and it by no means follows that the same glass will be accepted by two individuals of equal age whose static refraction and muscular balance are identical.

As complete a knowledge as possible of the dynamic refraction is, in Dr. Green's estimation, a sine qua non of correct refraction. It has been his impression that those who use cycloplegics habitually, do not study the function of the "natural" eye, and pay little or no attention to the influence of the organism. The routine practice of deducting a certain amount from the static refraction as the basis for a prescription of glasses is especially to be deplored. Such a method leads frequently to serious error. Personally, he is a partisan neither of the non-cycloplegic school nor of the cycloplegic school, but occupies a middle ground. He believes we should begin the study of every refraction case by carefully estimating the dynamic refraction, calling to our aid the help of ophthalmometer and astigmatic charts. With the correction thus found, the accommodative capacity is tested by a prolonged reading test. If the slightest uncertainty exists that this correction will fail to relieve the symptoms, he at once orders a cycloplegic and re-examines by skiascopy and the trial case. Finally, a post-cycloplegic test is made. He is then in possession of three sets of measurements, on the basis of which the prescription is made up. Certain it is that there are very many cases in which a knowledge of the static refraction is absolutely indispensable, and the oculist who fails to acquire this knowledge need not be surprised if his results are mediocre. He who declines to determine the refraction of a cross-eyed child, for instance, with the aid of complete cycloplegic and objective and subjective methods, cannot be deemed a safe guide in the management of these cases.

Dr. Green sums up: (1) Estimate the dynamic refraction with painstaking care and test the ability of the patient to use this correction for far and near. (2) If any doubt, estimate the static refraction under cycloplegia. (3) Make a post-cycloplegic test. With the knowledge thus acquired the oculist will be in a position to prescribe glasses intelligently.

Dr. Llewellyn Williamson believed that in the great majority of cases, better and quicker results could be obtained by the use of a cycloplegic, but that its use should not preclude efforts to obtain all information possible about the eye in its natural state.

In illiterates, very young children, and especially in strabismus cases, where the refraction must be obtained by retinoscopy, he believed a cycloplegic to be necessary, for, while retinoscopy could be practiced without a cycloplegic, the results were not so satisfactory.

Dr. J. E. Jennings, when he commenced refractive work, had been taught by Dr. Jackson, of Denver, to determine the complete amount of error under a cycloplegic and then giving as nearly as possible a complete correction. In this case he used one grain of homatropin to thirty drops of water, putting in four or five drops of the solution. Before he used the cycloplegic he found, approximately, what glass the vision seemed comfortable with. He had never been able, accurately, to ascertain the amount of astigmatism without a cycloplegic. He knew there were men who claimed to be able to do this with the ophthalmoscope, but he had never seen them.

Mr. Gunn, of London, for example, than whom there is no more able ophthalmoscopist, and who prided himself on his ability to refract with the ophthalmoscope, had during his (Dr. Jennings') service at Moorfields been found in error in many cases.

A New Treatment for Corneal Ulcers.

(Dr. E. H. Higbee.)

For the past year and a half Dr. Higbee has been using lysol in serpiginous and rodent ulcers of the cornea, and has found it far superior to anything he has used heretofore. He has used it in full strength, but finds that a 5% and 10% solution is the best, as the application can be made every day.

It has the properties of penetrating well into the tissues without destroying them, and its antiseptic properties are superior to those of carbolic acid. He always cocainizes the eye, then applies the solution only in the ulcer by means of an applicator wrapped with cotton.

In a series of cases, five of which he reports, he has yet to see any bad results, although in some of them he used it in full strength. A drop of pure lysol having been put in a newborn baby's eyes by mistake at one of our hospitals, with no bad effects following, leads him to suggest the following substitute for Crede's method:

Put a few drops of a 2% solution in each eye without cocainizing, then bathe the entire head and face with a 5% solution. The saponifying action will loosen all the debris; wash this application off with pure warm water and bathe the head and face a second time, then simply dry with gauze.

This method has the advantage of cleansing all parts about the head and face, leaving them aseptic, and is quite as effective as the nitrate of silver.

Discussion.—Dr. Adolf Alt did not understand why there should be such a great difference in the treatment of ulcers with lysol, and in the treatment of ulcers with carbolic acid.

He has used lysol in a large number of corneal ulcers and he had found that in some it gave satisfaction and in others the results were not so agreeable.

The doctor had spoken of the caustic properties of carbolic acid. Dr. Alt had never seen any lasting bad results from a corneal burn produced by carbolic acid. About twenty years ago he had under treatment a boy with an infected wound of the eye from a blow with a whip that had been dragged in cow manure. He had used yellow oxide of mercury, heat, atropin, etc., but without any improvement. Finally, his druggist had suggested to him that he try an ointment with a new "bland" vehicle, and he applied some of this ointment. In a moment the boy's eye was white, and he screamed aloud with pain. Dr. Alt thought it had put the boy's eye out, but the next day it was much better. It developed that this ointment contained a large percentage of carbolic acid.

Dr. Alt asked Dr. Higbee if he knew how to explain the difference between the action of lysol and carbolic acid.

Dr. Higbee said that the saponifying effect of the linseed oil in the lysol protected the eye. He had at St. John's Hospital a young man who had emptied a bottle of carbolic acid over himself and though he had instantly closed his eyes when the acid struck him, yet enough had gotten into one eye so that when he came to the clinic he was so fearfully burned, he would never be able to see again. Lysol did not seen to have so caustic an effect as carbolic acid. He has used lysol more than a year, and considered it the nicest preparation he had ever used. He always used a local anesthetic first, for it is very painful without it.

Every oculist realizes the difficulty in stopping the process of some serpiginous ulcers, and cannot help being grateful for a remedy that will successfully combat this condition.

Llewellyn Williamson,
Section Editor.

BOOK REVIEWS.

Refraction and How to Refract.

By James Thorington, A. M., M. D., Philadelphia. Fourth Edition. P. Blakiston's Son and Company, Philadelphia, 1909. Price, $1.50.

We are pleased to note the appearance of the fourth edition of this work, in which the subject matter has been thoroughly revised and a number of new cuts added, illustrating some of the newer instruments and appliances useful in this field of ophthalmology.

In a volume as familiar as this, we do not deem it necessary to refer to the book in detail, but we take great pleasure in saying, that we know of no similar volume that has proved of greater satisfaction to the beginner in ophthalmology than Dr. Thorington's book on "Refraction" and, while not intended by the author for the use of the more experienced and older students, we fear that many of them have frequently taken pleasure in referring to it.

In the chapter on *Retinoscopy,* in which is condensed the essentials of the author's admirable and well-known work on this subject, we think it might be well to modify the statement that, "if the patient has a squint, then one eye should be covered while its fellow is being refracted," for, if the squinting eye has poor fixation, it will often be found that a more satisfactory result can be obtained by securing an eccentric fixation of the fellow eye.

While the author refers to the shadow test solely as a synonym for retinoscopy, in the reviewer's experience, the former term has always been confusing to students, unless the shadow is used in the sense of the retinal illuminations which is hardly consistent with the facts.

In the appendix which has been included in this edition the chief and most important subject is the author's "quick method" of refraction which he reported before the Ophthalmic Section of the College of Physicians in December, 1908. As this paper is published in full in the present number of the Annals, we refer the reader to the original.

We think Dr. Thorington is to be congratulated upon giving us this ingenious short route, and we quite agree with him that "in clinical work at least the assistant has a time-saver which he will enjoy."

He also points out that the blurring of the distant vision which sometimes persists after making the usual addition of a — .25 s. to our static refraction obtained at six meters, can be obviated if a similar addition is made to the static refraction obtained at twenty meters.

In conclusion, we can justly say that the fourth edition of this book will still further enhance its value to the students in this particular branch of ophthalmology.

T. B. Holloway.

Atlas of the External Diseases of the Eye, Including a Brief Treatise on the Pathology and Treatment.

By Prof. Dr. O. Haab, of Zürich. Third Revised Edition. Edited by G. E. de Schweinitz, A. M., M. D., Professor of Ophthalmology in the University of Pennsylvania. Published, 1909, by W. B. Saunders Company, Philadelphia and London. Price, $3.00.

Few interested in ophthalmology are unfamiliar with this popular work, which is now in the third edition. The present volume contains one hundred and one colored lithographic illustrations arranged on forty-six plates, and thirteen figures in the text of two hundred and forty-four pages.

In spite of the difficulty of portraying in colors the external diseases and conditions of the eye, the author has succeeded in producing a series of plates of exceptional beauty and accuracy. Many of the plates are, for drawing and coloring, beyond criticism, and reflect great credit upon the artist and upon those responsible for the mechanical reproductions.

Accompanying each picture is a legend, embracing a brief description or history of the case from which it was taken. The first eight pages of the book are devoted to *"The examination of the eye in disease."* The importance of this in detail is too frequently overlooked by the beginner or by him with limited experience. Let him think carefully of Prof. Haab's opening paragraph:

"In ophthalmology as in other fields of medical activity, success in diagnosis depends, above all, upon the experience of the diagnostician. Only second in importance, however, is a definite, systematic routine in examination, the faithful observance of which will eventually become second nature to the surgeon, so that he will almost instinctively apply all the various methods of examination one after another in their proper order."

Throughout the book Dr. de Schweinitz, as editor, has placed in brackets, comments pertinent to the subject under discussion. These add greatly to the value of the book for American readers, as they bring in alignment the differences of opinion which exist between foreign and American authorities regarding certain conditions and their treatment.

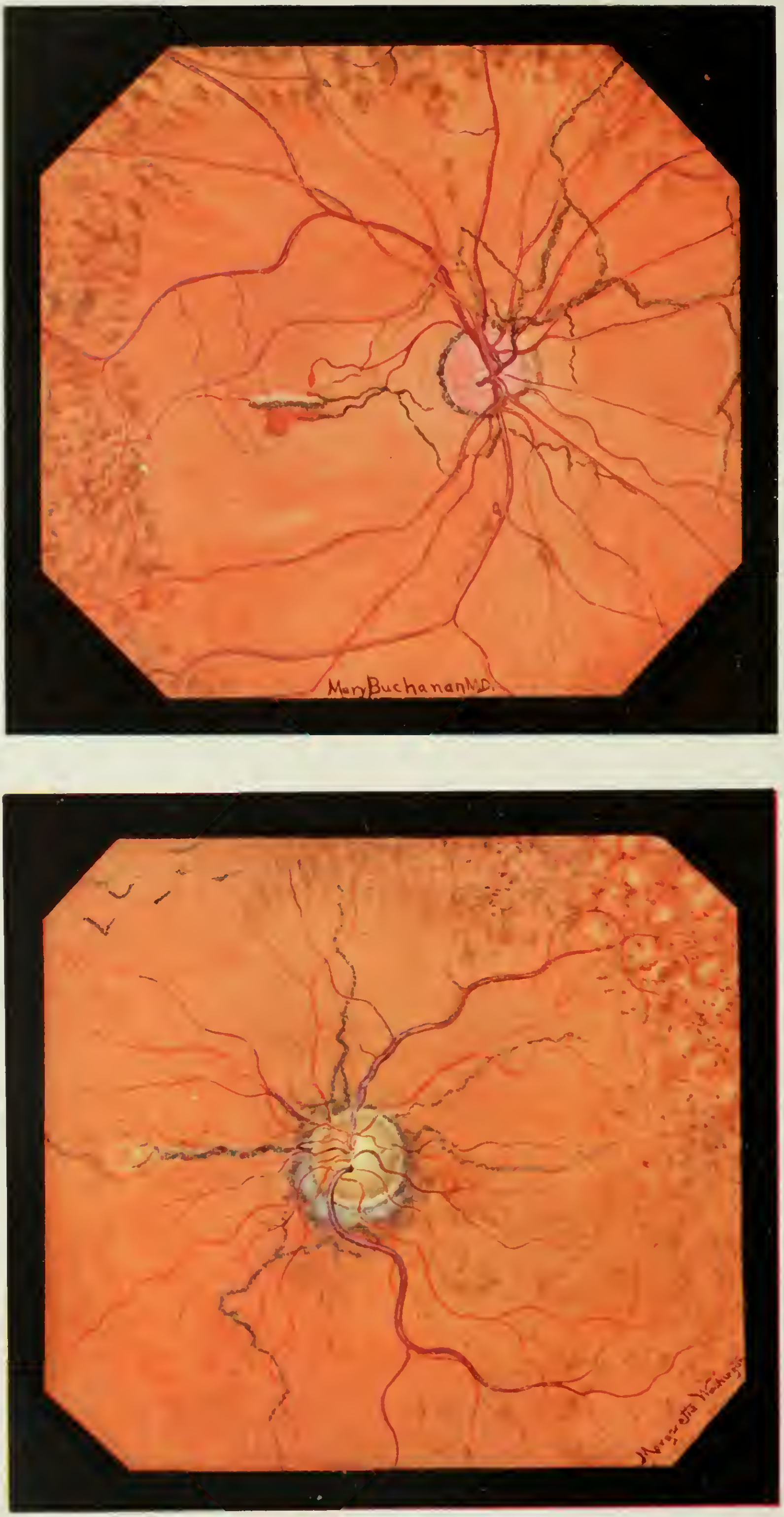
Both author and editor have brought this work right up to the date of publication, which makes of it a most satisfactory book for ready reference. William T. Shoemaker.

Atlas and Epitome of Ophthalmoscopy and Ophthalmoscopic Diagnosis.

By Prof. Dr. O. Haab, of Zürich. Second American Edition from the fifth revised and enlarged German Edition. Edited by G. E. de Schweinitz, A. M., M. D., Professor of Ophthalmology in the University of Pennsylvania. Published, 1909, by W. B. Saunders Company, Philadelphia and London. Price, $3.00.

Like the Atlas on External Disease of the Eye, reviewed above, this book needs no introduction, but will be gladly received in this its second American edition. A few new chromo-lithographs have been added by both author and editor. There are one hundred and fifty-two colored illustrations, a number of them being taken from microscopic sections of both normal and diseased portions of the eye. The descriptive legends are particularly full and instructive.

Eighty-seven pages of text are devoted to a description of the ophthalmoscope and its uses; the methods of fundus examination, the normal fundus, etc. This book and the preceding are unexcelled in that they so admirably fulfill the author's intentions, and so thoroughly cover the subjects included. William T. Shoemaker.



Angioid streaks in the retina.

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OCULAR SYMPTOMS OF ARTERIOSCLEROSIS.*

WILLIAM EVANS BRUNER, A. M., M. D.,

CLEVELAND, OHIO.

Arteriosclerosis in its fully developed form is a disease readily recognized. Its cardinal points are:

1—thickening of the peripheral vessels,

2—signs of hypertrophy of the left ventricle as shown by displacement outward of the apex beat, the thudding first sound, and the accentuated aortic second,

3—increased blood pressure.

4—a slight and variable amount of albumen in the urine.

With this group of symptoms present, it is not difficult to make a diagnosis but unfortunately it is then too late to accomplish very much by treatment.

As stated by Osler[1] in the chapter upon diseases of the arteries in a recent volume of *Modern Medicine,* the vessels of the head, of the heart or of the kidneys may be in an advanced stage of sclerosis without any change in the palpable arteries. In its development the disease may progress more rapidly in the large or in the small vessels but the most serious form is that in which the smaller vessels are chiefly affected and which comes on in middle life or in young persons. It may be in part a senile change and in part a definite result of a pathologic stimulus and these two components, as Coats says, are not always easily separable.

***Read before the Ohio State Medical Society at Cincinnati, May, 1909.**

In the pathologic as distinguished from the normal or senile arteriosclerosis, says Stengel,[2] the causes which have brought about the disease also tend to make its progress in one part more rapid than in another, and we find that when manifest clinical symptoms develop, the brain, the heart, or the kidneys may suffer disproportionately, so that in the late stages one case may present itself in the aspect of a cerebral disease, another as a cardiac, and another as chiefly a kidney disease.

As the most serious form is that which involves the smaller vessels, it is evident that from the point of diagnosis it is important not so much to detect the changes in the main trunks and large arteries as it is to recognize involvement of the smaller vessels.

While the disease in any of these typical forms is in its fully developed stage easily recognized, a positive determination of the existence of the earlier stages is, according to Stengel, extremely difficult but most essential, if we are to accomplish anything in the way of controlling the progress of the disease. The arteries of the retina are small arteries and terminal ones at that, which by means of the ophthalmoscope we can actually see and carefully study without interfering in the slightest with their functions, and can there observe changes which would be too slight to detect by touch in small arteries elsewhere. Osler says the retinal arteries are the most important blood vessels in which to see early thickening and Stengel also calls attention to the possibility of early diagnosis by ophthalmoscopic examination, while Parsons[3] states that "primary arteriosclerosis as a part of a general arteriosclerosis is not uncommon in the retina."

The angiosclerotic changes are often very irregular in distribution. While different areas may be affected as the brain or the kidney, even within the same area, vessels of different size may be differently affected and we may even find notable differences within a short space in the same vessel. While changes in the retinal vessels may be manifest in any type of arteriosclerosis, they are particularly apt to be present in the so-called cerebral type of the disease, and yet even in this type we must realize the limitations in the value of our findings and recognize the fact that certain reservations must be placed upon the interpretations of the ophthalmoscopic examination. As in suspected brain tumor the presence of choked disk is the strongest evidence in favor of such a tumor, while the absence of swelling of the nerves is not positive proof of the absence of a tumor, so here the positive evidence is much more valuable than the negative. There may be indications of an extensive atheroma of the general arterial system and yet none in the retinal vessels. On the other hand the general evidences of arteriosclerosis may be slight while the evidence in the retinal arteries may be marked. In short "the degree of the variations in calibre (or sclerosis) of the retinal arteries does not bear," as Friedenwald says,[4] "a definite relation to the signs of arteriosclerosis in other parts of the body." While the absence of change in the arteries or other structures of the retina is not proof that other vascular areas are normal, the presence of such changes is of most positive and valuable significance. As Geo. Coats says, "Although this fact detracts somewhat from the value of the ophthalmoscopic evidence of general vascular disease, yet it remains the best indicator of the state of the vessels generally that we possess."

Gowers[6], one of the earlier writers upon this subject, in a most valuable paper brought forward this fact that the chief importance of these evidences of angiosclerosis of the retinal arteries lies in their association with a more general arterial disease of similar nature, particularly in the kidneys and brain, and in its prognostic value in regard to the results which may follow in the cerebral vessels. As the distribution of the arteriosclerosis may be localized, so the vessels of the eye and brain may be affected without those of the kidney being involved. Granular kidney associated with arteriosclerosis is often not accompanied by albuminuria.

In the presence of arteriosclerosis of the retinal vessels the prognosis becomes important in two aspects, as regards the vision, and as it concerns the life of the patient. We are all familiar with the general prognostic significance of albuminuric retinitis. The majority of patients die within two years after its inception and a considerable percentage within the first year of its development.

In ocular arteriosclerosis, Woodruff[7] says, "Not until the gross lesions have shown themselves in the eye can we positively say that a fatal termination is apt to occur. The mere fact that such conditions exist in the retinal vessels does not warrant us in assuming that the disease is going to progress to such a stage as to affect the function of the kidneys or to cause degenerative changes in the brain." Gunn states that it is only in cases where retinal changes have so far advanced as already to have caused hemorrhages in the retina that we could speak of the probability of an approaching cerebral hemorrhage.

The fundus changes may, according to de Schweinitz[8] who has written extensively on this subject, be divided into those which are suggestive and those which are pathognomonic. Among the suggestive signs he includes uneven calibre and undue tortuosity of the retinal arteries, increased distinctness of the central light streak, an unusually light color of the breadth of the artery and alterations in the course and calibre of the veins. The pathognomonic signs are of course the important ones and to these we wish especially to refer.

The first as well as the most important changes to be observed in the eye in arteriosclerosis are in the retinal vessels.

Tortuosity of the vessels is only suggestive and is of importance only when associated with other signs.

Irregularity in the calibre of the retinal arteries points more strongly toward angiosclerosis of these arteries. Sometimes a vessel may be of normal calibre for a distance, then be narrowed slightly even to a mere thread and later broaden out again to normal width. Alternate constriction and widening of a vessel may give it a well defined beaded appearance.

The light reflex from the arteries may appear more distinct and exceptionally bright with an unusual light color of the entire breadth of the artery. This brighter reflex is seen not merely in the vessels about the disk as in other conditions, in fact it is usually the secondary and tertiary branches of the central artery that are mainly affected. This increased brightness of the light streak gives rise to the term "silver wire" arteries sometimes used in describing them.

Another sign is loss of translucency in the vessels as manifest where an artery crosses a vein. In the case of an overlying vein the opposite effect may be produced, the artery may be seen more clearly than usual, due in part to the increased brightness of the arterial reflex and partly to the thickness of the venous blood stream being somewhat less at this point.

Most important of all these signs is the influence of the arterial pressure on the venous blood stream. This is shown most frequently by compression of the vein by the overlying artery. This appearance might be roughly compared to that seen if a small metal rod is laid across a piece of rubber tubing, which would show indentation or compression from the metal rod. Normally no such compression of the vein is caused by an artery resting upon it, but when the artery is sclerosed or hardened, it will produce visible changes in the vein. At first the vessel may appear to be slightly pushed aside. Later definite pressure is apparent, and still later evident interference with the venous blood current becomes manifest as shown by the enlargement or ampulliform dilatation of the vein to the peripheral side of the point of crossing. When the vein crosses the artery it may appear flattened out or slightly elevated, possibly losing its light streak but permitting the artery to be seen more readily than normal through it. There may also be increased tortuosity of the veins and alternate contractions and dilatations.

Often in the early stages this flattening of the veins where crossed by the arteries with possibly the "silver wire" appearance of the arteries may be the only indication of changes in the retinal arteries, though de Schweinitz[9] says two other signs may commonly be seen very early, "markedly corkscrew appearance of certain arterial twigs, either of those which skirt the macula or more significantly of one or more small branches which arise from the larger vessels of the main distribution which themselves may be apparently normal, and a "congested" appearance of the nerve.

White lines may appear along the vessels which must be distinguished from the perivascular lymph sheaths often marked on or near the disk in healthy eyes. These may be due to two changes, an endothelial proliferation or a thickening of the connective tissue coat. "This distinction may be of importance," says Coats, "as the two conditions may be due to different causes." The first or endothelial proliferation indicating disease of the intima is most probably due to toxins circulating in the blood which would most naturally affect the intima, while the thickening of the connective tissue is probably a strengthening of the wall to compensate for increased blood pressure.

Edema of the retina may become manifest as a grayish opacity about the nerve, or in the macular region, and along the course of one or more vessels or in small spots in the periphery; and also hemorrhages which may be very small and few in number or even solitary, linear in type along the vessels, or round spots scattered over the fundus or sometimes large ones of the so-called subhyaloid character.

In a study of the relation between retinal hemorrhages and high arterial pressure in one hundred patients, Fox and Batroff[10] found that eighty per cent. of the individuals with retinal hemorrhages present were suffering from a temporary or permanent high arterial pressure, so that they were led to believe that the excessive pressure is apparently the most frequent exciting cause of hemorrhages. In regard to the clinical diagnosis they recorded chronic interstitial nephritis in 40%, arteriosclerosis in 27%, chronic parenchymatous nephritis in 13%.

White or yellowish patches of exudate may also appear and as the disease progresses we have the picture of advanced arteriosclerosis. We now may have exudate in the retina without or with hemorrhages which may be more or less extensive, with greater or less edema of the nerve, in fact all the signs of a typical albuminuric retinitis. In one case the exudate in the retina may be the prominent characteristic, in another the retinal hemorrhages, and in another the nerve changes, or we may have any combination of these.

While the signs in the early stages of the disease may be difficult of observation and can be detected only by an expert and then sometimes only when the pupil has been dilated, in the late stages the changes can be readily seen by any one who can use the ophthalmoscope, but unfortunately they are not so valuable at this stage for the welfare of the patient, as the disease has already progressed to a point where relatively little can be done for it.

Two important manifestations, both obstructive, of vascular disease are thrombosis of the central vein or any of its branches, and so-called embolism of the artery or its branches. While we may have thrombosis of the central vein in young subjects with no signs of arteriosclerosis in the other eye or elsewhere in the body, we are here concerned with the type which occurs in elderly persons with general arteriosclerosis and usually also albumen in the urine. While this condition per se seems according to Coats to afford very little information with regard to the prognosis for life, in several of my patients there has within a comparatively short time been a stroke of paralysis.

A fact important to bear in mind is that glaucoma not infrequently develops in these eyes with thrombosis of the central vein and the danger of this should be borne in mind if you use a mydriatic in making the ophthalmoscopic examination.

Obstruction of the central artery is mentioned as so-called embolism for the reason that at least the majority of these cases which have been looked upon as embolism are, as shown by autopsy, not due to embolism but to an endarteritis or thrombosis.

Spasm of the retinal artery is an interesting but rare manifestation of this disease, occurring most frequently, according to Greenwood,[11] "in the early stages of arteriosclerosis and should be looked upon as a warning of future obliterating endarteritis." While cases of probable spasm of the retinal arteries have been met with by many observers, very few have had the opportunity of examining an eye during the attack. Wagenmann and Benson report seeing single attacks, and Sachs a spasm of a branch of the central artery, and Zentmayer[12] describes a case in which he saw the patient in not merely one but numerous attacks from the beginning to the end—the oncoming spasm, the occlusion of the vessels and the relaxation, with the accompanying symptoms—the obscuration of the field beginning in the periphery, the totally dark field and then the gradual clearing which also began in the periphery.

Various lesions of the optic nerve are at times found associated with or due to arteriosclerosis. I have already referred to be congested nerves which de Schweinitz speaks of as one of the early signs. I have observed several cases of edema of the optic nerve and in particular recall a recent case in which the edema of the nerves preceded the retinitis.

Retrobulbar neuritis may also occur, of an acute type as in a case very recently seen by myself, or in the chronic form. Marcus Gunn points out that irregularity in the calibre of the retinal arteries is often associated with retrobulbar neuritis and believes it reasonable to suppose that the small branch from the central artery of the retina which supplies the axial fibers of the nerve near the papilla may by its degeneration affect the nutrition of these fibers and so produce the ordinary symptoms of retrobulbar neuritis.

Zentmayer[12] reports a case of optic atrophy where arteriosclerosis appeared to be the primary cause of the degeneration, and Bull[13] thinks we may have a pressure atrophy of the optic nerve, either local, involving only certain fibers with resultant scotoma, or general from sclerosis of the ophthalmic artery. He also is of the opinion that some of the cases of so-called simple chronic glaucoma are in reality cases of atrophy of the optic nerve due to retrobulbar arteriosclerosis of the internal carotid or ophthalmic artery or the anterior cerebral artery which by pressure on the optic nerve posterior to the foramen has caused the descending atrophy.

Arteriosclerosis or increased blood pressure is not uncommonly met with in glaucoma, especially the hemorrhagic form, and we have already referred to the glaucoma which supervenes upon thrombosis of the central vein of the retina, a lesion closely associated with angiosclerosis. Brailey and Edmunds[14] found the arteries diseased in sixteen out of seventeen eyes excised for hemorrhagic glaucoma, and more recent investigations will I believe sustain these conclusions. Knapp, as quoted by Suker,[15] says "glaucoma is not so much a consequence of faulty development but rather an inflammatory affection which in all probability develops as the result of a chronic organic disease, and here I think vascular sclerosis is the most likely cause, and if there are more causes than one this one appears most frequent. This agrees also with pathologic investigation and while arteriosclerosis does not forcibly produce glaucoma it may easily prove a powerful predisposing condition." In any type of glaucoma the condition of the blood vessels and the arterial tension should be studied and the presence of an arteriosclerosis or an increased blood pressure may have an important influence in the line of treatment. Dunn[16] in a recent article dwells upon the practical value of this in treatment not only of glaucoma but also of various other diseases of the eye.

The possibility of arteriosclerosis should be thought of as a causative factor in certain affections of the chorioid especially of the degenerative type. Parsons[20] says "special forms are seen usually associated with general disease of the vascular system. The arteries are most affected, showing hyaline degeneration of their walls, perithelial proliferation, miliary aneurisms, hyaline thrombi, endarteritis obliterans and arteriosclerosis," and Lawford,[21] in his recent address before the American Academy of Ophthalmology upon the etiology of chorioiditis, states that "vascular changes in the form of widespread arteriosclerosis which are so well known in the late stages of syphilis and which are among the most serious results of that fell disease, not infrequently lead to chorioidal changes of a degenerative type."

It would appear reasonable that paralysis of one or more of the ocular muscles might be caused sometimes by pressure upon the nerves from a sclerosed vessel at the base of the brain. Pechin and Rollin[17] report a case of left sided external ophthalmoplegia complete and total, and on the right side partial ptosis and paralysis of the superior rectus, in which the post mortem examination indicated that the paralysis was probably due to pressure of the sclerosed carotid artery which in its course along the cavernous sinus compressed the nerves along the outer wall. Of course we all recognize as a possible cause of such paralysis an hemorrhage from or rupture of a sclerosed vessel.

Gunn and many other oculists have noticed the frequency of lenticular opacities in eyes showing arterial changes and suggested that the ciliary arteries may be similarly affected and the nutrition of the lens thereby suffer. Green[18] of Dayton who has a large experience at the Old Soldiers' home recently published the results of his investigation concerning the association of age and incipient cataract with normal and pathologic blood pressure, showing as he believes that the rise in the percentage of cataracts with age is greater in those with pathologic than in those with normal blood pressure.

While I have nowhere observed any suggestion upon a possible relation in some cases between vitreous opacities and sclerosis of the ocular vessels or increased blood pressure, I am led to believe from my own experience that this subject is worthy of further consideration and observation. Certainly I have in some instances met with such opacities in angiosclerotic individuals, in some cases where the vitreous opacities were evidently due to readily observed intraocular lesions as hemorrhages but in other cases where no such macroscopic lesions could be observed with the ophthalmoscope. The sclerosis of the ocular vessels by interfering with the nutrition of the eye might readily account for such opacities in some cases. The possibility of arteriosclerosis as the cause should be considered in the obscure cases of recurring hemorrhage in the vitreous.

While subconjunctival hemorrhages are often of no significance and are found in individuals apparently perfectly healthy, recurring hemorrhages of this type should suggest the possibility of such arterial changes and should lead to thorough examination of the circulatory system and also of the urine. As deSchweinitz says in speaking of these subconjunctival hemorrhages, "they are the little leaks announcing that a greater break is not far off."

The writer just mentioned also refers to cases of persisting asthenopia occasionally seen, especially in women in the late forties, which do not yield to optical treatment but are not infrequently relieved or materially modified if the high arterial tension is lowered by proper dietetic measures and particularly by the use of nitroglycerine.

A few cases will serve to illustrate some of the points brought forward in this paper:

CASE I. This case shows the value of the fundus findings as a means of differential diagnosis between brain tumor and arteriosclerosis

Mrs. S., age 54, was sent from a neighboring town to a surgeon in one of our hospitals with a diagnosis of brain tumor for operation. Sight is said to have failed rapidly in 1904. In March, 1905, she had her first convulsion which has been followed by others at varying intervals. A physician who examined her eyes thought there was an optic neuritis in the left eye but not in the right. Her vision was O. D. 6/60, O. S. 6/12. Speech was always worse after these attacks and both it and her memory had been getting worse so that now she has difficulty even in telling her name and age. She thinks the vision is getting worse but when I first saw her November 1st, 1906, it was the same as that recorded by the other physician one and a half years previously. There was no headache nor vomiting, pupils were equal and responded to light. The form fields were normal and all movements of the eyes were good except convergence which could be accounted for by the poor vision of the right eye. The urine was normal. Ophthalmoscopic examination showed in the right eye very brilliant light reflex from the arteries, veins full and tortuous and some of the small veins especially tortuous, veins definitely compressed by overlying arteries at points of crossing with slight dilatation of some of the veins beyond the point of compression and one small hemorrhage in the macula. The left eye showed similar condition except there was no hemorrhage. There was no swelling whatever of the nerves nor any evidences of secondary atrophy. Although the absence of papillitis in cases of suspected brain tumor is only of negative value, I expressed the belief that the condition was due to arteriosclerosis of the cerebral vessels with probable degeneration. A neurologist was also called into consultation and he thought the symptoms warranted a diagnosis of brain tumor despite the absence of ocular symptoms and advised operation. The operation was accordingly made but no evidences of tumor were found. The patient later died and at the autopsy there was found to be marked arteriosclerosis of the cerebral vessels and no brain tumor.

CASE II. Mr. F. H., age 54, an active business man, consulted me in September, 1907, because he thought that his reading glasses which he had gotten from an optician needed to be changed. With the proper correction, normal vision was readily obtained in each eye. Ophthalmoscopic examination showed the veins rather full and at several points compressed by the overlying artery. The calibre of several of the arteries varied slightly, being more narrow at some points. There were no hemorrhages nor any lines along the vessels, in fact nothing else pathologic. I had asked him in regard to his general health which he said was excellent, in fact could not be better. I found his pulse full, tension high. When I told him his retinal arteries gave evidence of arteriosclerosis, he acknowledged that he had been under Dr. Sawyer's care for some years for this condition and that six years ago he had been sent to Dr. Janeway of New York. His urine was normal. He is a rather heavy eater but does not eat red meats, pastry nor various other proscribed articles of diet, does not use stimulants nor smoke, but works at very high pressure and takes no exercise. Since then he has had a slight attack affecting his speech for a time, and has also been ill with pneumonia. He has lost much in weight. His heart is weak. Fundus shows same appearance.

CASE III. J. H. M., age 64, consulted me for reading glasses in May, 1907, with a history that his general health was excellent. With the correcting lenses the vision was normal in each eye and the correction gave him excellent reading vision. Ophthalmoscopic examination showed in the right eye one small white patch looking like retinal exudate partially concealing the vessel. The light streak from the vessel was more pronounced than usual and at several points the veins were compressed by the overlying artery. The left eye showed the same condition of the vessel but no exudate. There were no hemorrhages in either eye. Pulse was full, somewhat arythmic, tension rather high. I reported my findings to Dr. Cushing, who informed me that two years before the patient had had a slight hemiplegic attack due he thought to cerebral arteriosclerosis. This attack rapidly cleared up. Later when I saw him again there was an appearance of one very small retinal hemorrhage in the right eye.

Case IV. J. D., age 69, consulted me in October, 1908, with the history that several months before he had had a slight stroke affecting his speech. He has noticed some blur before his eyes which is worse since the attack. Ophthalmoscopic examination revealed marked signs of arteriosclerosis, some small arteries and veins very tortuous, very marked compression of the veins wherever crossed by an artery with dilatation of the vein beyond the point of pressure, several small round hemorrhages in the right eye and more numerous ones in the left and in addition in the right eye a slight edematous appearance of the optic nerve. The right eye also showed a central partial scotoma, indicating a *retrobulbar neuritis*. All his peripheral vessels showed marked arteriosclerosis .and his physician, Dr. Lichty, reports blood pressure 180 to 190, albumen and casts in the urine—an interstitial nephritis. He died December 27, 1908, from cerebral hemorrhage.

Case V. Mrs. K., age 44, consulted me in August, 1908, because of a blur before the left eye which had come about three weeks previously. She was feeling finely and thought herself in the best of health. With glasses vision was, with the right eye 6/9, with the left 6/45. Ophthalmoscopic examination showed in O. D. the nerve slightly prominent or edematous with all edges hidden, and in O. S. decided swelling of the nerve, one hemorrhage on the nerve but none elsewhere and several indistinct pale spots of exudate. The form field was normal in the right eye while in the left there was an absolute scotoma to the outer side of fixation. She was sent to her family physician who reported nothing abnormal but a faint trace of albumen in the urine. Two days later the swelling of the optic nerves appeared more marked in each eye and in the left there was a fresh hemorrhage and in the macula some white patches of exudate. When I saw her a month later her physician had told her the urine was now normal. She was feeling finely. Ophthalmoscopic examination showed an increase in the fundus changes. In the right eye the nerve still appeared edematous, the arteries showed variations in calibre and very pronounced light streak. In the left there were no hemorrhages. There was still edema of the nerve and much exudate all around it while in the macular region the patches of exudate had increased and taken a somewhat star shaped arrangement usually so characteristic of albuminuric retinitis. The pulse was full and bounding. I sent her to another physician, Dr. Hoover, in consultation, who confirmed my suspicion of arteriosclerosis. Blood pressure was 250, the apex of the heart three fingers breadth beyond the nipple line, no albumen in urine. Here was a case of a very marked and serious type of arteriosclerosis, and yet she is the picture of health and says she feels as well as she looks and would not think of consulting a physician except for her eye. It is needless to add that the prognosis in her case is decidedly bad. Saw her again January 21, 1909, when vision with O. S. was 6/9 partly. There is still an enlarged scotoma at the normal blind spot but no color scotoma between it and fixation as before, edema of the nerves decidedly less, spots of exudate much less numerous and no hemorrhages.

Case VI. C. M., age 48, consulted me in July, 1906, because of a slight blur before the left eye. I had seen him at various times for eight years but had found healthy eyes and normal vision, though he had complained of muscae volitantes. I now found the right eye healthy but in the left some retinal hemorrhages near the macular region and below it, and several patches of white exudate. He was referred to Dr. Season, who reported arterial tension 180, heart normal, a trace of albumen and a few casts in the urine which had a specific gravity of 1010. He stopped work and was put upon proper treatment and regimen with the result that three months later the eye had much improved, the exudate and hemorrhages had almost disappeared and vision had increased from 6/12 to 6/7.5. I did not see him again after that but recently learned that his arteriosclerosis had gradually improved but in July, 1908, he died of acute tuberculosis following pneumonia.

Case VII. A. B., age 54, consulted me in July, 1906, for glasses. An ophthalmoscopic examination without a mydriatic was negative. With the proper lenses he had normal vision in each eye. In March, 1908, he had an attack of aphasia, flaccid paralysis of the right arm and spastic of the right leg with some spastic movements. His physician, Dr. Cushing, thought it might be a cerebral tumor or else an embolism and called me to see him the following morning. Examination of the eyes was negative so far as any symptoms of cerebral tumor were concerned. The pupils were so small that the vessels could not be studied carefully. Several days later he was again seen and the pupils then were dilated for a more thorough ophthalmoscopic examination which revealed some fine *floating vitreous opacities* in each eye and at several points in each, more especially in the left, compression of the veins by the overlying arteries. Subsequent history would tend to confirm the diagnosis suggested by the ophthalmoscopic appearances, cerebral hemorrhage or embolism consequent upon arteriosclerosis of the cerebral vessels. This man was a tremendous worker, lived a very simple life, and was not a heavy eater and did not use stimulants.

Case VIII. C. T., age 59, was first seen in January, 1895, for glasses. Vision of O. D. ability to count figures. This had been poor all his life. O. S. 6/18 and with glasses 6/6. In January, 1904, he called again with the history that when he awoke that morning the right eye was blind. Ophthalmoscopic examination showed the right nerve edematous and pale with all edges hidden and several pale spots in the macular region. Medical examination revealed marked arteriosclerosis, slight hypertrophy of the heart and slight trace of albumen in the urine. Later examination in May under a mydriatic when the retinal edema had subsided showed the nerve of this right eye very pale, arteries and veins both contracted. In the artery extending down from the disk the calibre suddenly becomes much narrowed. At this point is a pale spot in the vessel looking like an obstruction and beyond this point the vessel can barely be made out as a faint line with some whitish streaks along it. Near the periphery the artery can again be more easily seen. The case was one of so-called *embolism* or *thrombosis* of a *branch* of the *central* artery of the retina.

Case IX. Mr. B., age 53, consulted me in December, 1894, because of blurred vision of the right eye of four weeks' duration. Ophthalmoscopic examination revealed a *thrombosis of the upper temporal vein* a short distance from the nerve with extensive hemorrhages throughout the distribution of the vein. The thrombosis took place just where an artery crossed and compressed the vein. There were retinal hemorrhages also in the other eye. His physician, Dr. Bernstein, at first reported the urine negative but later found a trace of albumen and some casts. Arteriosclerosis was well marked. Seven months later a thrombosis occurred in another vein of the same eye. Extensive vitreous opacities developed. In March, 1902, the patient had a stroke of paralysis.

Case X. Mr. L., age 59, consulted me November 16, 1904, because of blurred vision before the right eye. Vision O. D. 6/60, O. S. 6/6. Ophthalmoscopic examination revealed *thrombosis* of the *upper temporal vein* a short distance from the nerve with extensive hemorrhages, and exudate in the area of distribution of the vein. The veins showed marked compression by overlying arteries, form field was markedly contracted below, especially down and in. The urine showed a trace of albumen. Arteriosclerosis was marked. Two months later, January 26, 1905, he had a cerebral hemorrhage while visiting the dispensary and died the same day in the hospital.

Case XI. Mrs. P., age 75, consulted me in May, 1907, with blurred vision of the right eye. I had previously seen her and found the left eye totally blind from old chronic glaucoma. Ophthalmoscopic examination now revealed the typical picture of *thrombosis* of the *central vein* of the retina. She was referred to Dr. Hoover, who reported a slight trace of albumen in the urine which had a specific gravity of 1023, hypertrophy of the heart and aortic insufficiency, and arterial tension 250.

Case XII. K. J., age 48, consulted me in January, 1898. Vision O. D. 6/60, O. S. 6/45. Ophthalmoscopic examination showed *vitreous opacities* in the right eye and in the left several retinal hemorrhages. She was seen several times subsequently with *recurring hemorrhages* in the vitreous. The urine showed some albumen. In 1902, there were still extensive vitreous opacities in the right eye and retinal hemorrhages in the left. The arteries and veins were both tortuous and the arteries caused definite compression of the underlying veins

CASE XIII. B. G., age 68, consulted me in December, 1901, for *paralysis of the left oculo-motor*. Medical examination showed marked arteriosclerosis, enlargement of the heart and a slight trace of albumen in the urine. The fundus examination was negative. There was nothing else in the history so far as we could learn nor in the physical examination other than the arteriosclerosis to account for the oculo-motor palsy.

CASE XIV. Mrs. C. L. H., age 63, consulted me March 17, 1909 for some confusion of vision when she looks downward. She always had good eyes and with the proper lens readily obtains normal vision in each. Examination of the muscles shows a *paralysis of the right superior oblique* and the ophthalmoscope reveals compression of the veins by the overlying arteries and in the left eye one small linear retinal hemorrhage. Dr. Season reports arteriosclerosis, arterial tension 235, a large amount of albumen in the urine with granular and hyaline casts and an enlarged heart.

CASE XV. Mrs. J. W. M., age 60, consulted me February 9, 1909, with a history that for several years she has been having *recurring subconjunctival hemorrhages*. They have been especially frequent the past few months and in each eye can now be seen some small ones. The eyes give her no trouble. Her glasses are correct and vision with them is 6/5 in each eye. She is under Dr. Hoover's care, is on a strict diet and leading the "simple life." A year ago her blood pressure was 185 to 190, now is about 160. The urine shows a slight trace of albumen which is only secondary. Ophthalmoscopic examination shows only two points of apparent slight compression of the veins by the overlying arteries and some tortuosity of the small vessels skirting the macula.

CASE XVI. C. K., age 54, consulted me for *severe frontal headaches* not relieved by any treatment. Refraction O. D. + .50 s, V.—6/12; O. S. + 50s, V.=6/6; reading best with

+ 2.50s added. Ophthalmoscopic examination shows the veins markedly compressed by the overlying arteries. Several arteries present variations in calibre and are decidedly narrower at some points. The light streak is very pronounced and there is marked tortuosity of the small vessels especially near the macula of the right eye. Medical examination revealed a marked amount of albumen in the urine and arteriosclerosis with a blood pressure of 220. As the glasses which he was already wearing were correct he was referred to the medical department for treatment.

CASE XVII. J. T., age 55, consulted me April 20, 1903, in regard to his glasses and also because of a slight chronic conjunctivitis. With the proper lenses O. D. + 1.00s and O. S. + 1.25s, V.=6/5 in each eye and the fundus of each was healthy, except that at several points the veins showed slight compression by the overlying arteries. He was under Dr. Cushing's care but I saw him from time to time. November 21, 1906, compression of the veins by the arteries was more marked and in the left eye were two small retinal hemorrhages. June 11, 1907, complained of dizziness and was sleepy much of the time. The ophthalmoscope showed variations in calibre of the veins, one small hemorrhage in the left eye. The patient died March 10, 1908, from arteriosclerosis.

CASE XVIII. Mrs. H. K., age 54, consulted me January 14, 1907, for glasses. An ophthalmoscopic examination showed slight compression of the veins by the overlying arteries. March 2, 1909, she came again to see if the glasses needed changing. Except for some indigestion she says her general health is good. With the proper lens she readily obtains 6/5 vision in each eye. The ophthalmoscope now reveals decided compression of the veins by the overlying arteries, the veins slightly tortuous, increased light streak, variations in calibre of the retinal arteries and several small round and linear retinal hemorrhages. Pulse was full with high tension. She was referred to her family physician with the diagnosis of arteriosclerosis but unfortunately no complete report has as yet been received from him.

CASE XIX. Mr. C. M. S., age 66, came for glasses March 19, 1909. I had seen him five years previously for subconjunctival hemorrhage. He uses alcohol to excess and is subject to rheumatism. Radial and temporal arteries show marked arteriosclerosis and tension is decidedly increased. Ophthalmoscopic examination reveals marked compression of the veins by the overlying arteries.

CASE XX. F. W. S., age 30, consulted me January 25, 1909, because of a blur before the right eye which came on five days previously. He gives a history of a similar attack three years ago which gradually cleared up. He denies all specific history. General health has been excellent. He is very fond of athletics, was an instructor or coach for several years and has overstrained or overexerted himself. The interior of the left eye is healthy but in the right there are extensive *vitreous opacities*, some more or less organized, also fresh blood in the vitreous and numerous retinal hemorrhages. Vision O. D. 6/45, O. S. 6/5. Dr. Season reports a mild grade of arteriosclerosis, blood tension 140 and slight enlargement of the heart (apex one inch to the left). The urine shows a faint trace of albumen and a few hyaline casts. Under treatment, medicinal and hygienic, vision March 10, 1909, had improved to 6/7.5 partly. The vitreous had become very much clearer so that now a good view of the fundus could be obtained. No change could be made out in the vessels except possibly the light streak was more pronounced than usual and in the far periphery below was a white patch looking like exudate in the chorioid.

In conclusion, it is evident therefore that the ocular manifestations of arteriosclerosis are numerous and varied; but from the diagnostic standpoint, it is the group of signs which occur in the early stages of the disease that are especially important to the general physician. While it is true, as Stengel says, that "there are numerous and varied conditions of the system organic and nervous in origin that elevate blood pressure nearly constantly and in which arteriosclerosis has no part except perhaps as a consequence, and any of these conditions may occasion the symptoms of arteriosclerosis," these ophthalmoscopic signs seen in the early stages are in the words of deSchweinitz "produced by no other condition except the persisting high arterial tension of arteriosclerosis and therefore eye ground examination is of paramount importance in the early recognition of vascular disease and may render signal aid in the interpretation of symptoms caused by derangement of the function of important organs, which in their turn are dependent upon sclerotic changes in their smaller vessels, although there is as yet no decided alteration in the general circulation."

Here is a field in which the oculist may be of material assistance to the general practitioner and again it suggests an important duty to the ophthalmologist, a duty upon which I would lay special stress as it is unfortunately all too frequently neglected. Many of these patients who think themselves in good health consult us for presbyopic correction, and a careful ophthalmoscopic examination such as should always be made will reveal the signs of beginning arteriosclerosis, possibly only the very earliest signs, tortuous vessels, increased light streak and indentation of the veins or possibly only the so-called suggestive signs. This is the time of all others when something can be done for these patients and they should be referred at once to their family physician or the proper expert who can institute the necessary measures to avert the more serious later stages of the disease.

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ACCURACY IN THE MEASUREMENT OF REFRACTION.*

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Many persons with ametropia of low or moderate degree use their eyes freely and suffer no inconvenience. From this it is often assumed that to leave uncorrected a part of the refractive error when prescribing lenses will not seriously lessen the benefit. This assumption involves two errors. First, that all persons can overcome ametropia without feeling the worse for it; and second, that the altered ametropia created by a partial correction will be as well tolerated as the same amount of ametropia arising during the development of the eye, and to which the patient has always been accustomed.

The fact is, those who do not suffer from their ametropia do not come to us for relief. Those who do come do not endure with comfort the strain which an error of refraction imposes. The same error of refraction which will cause in one person no discomfort whatever, will produce in another continuous aching of the eyes and head, in a third terrific paroxysms of sick headache, in a fourth conjunctivitis, in a fifth chronic inflammations of the lid margins, and in a sixth disturbances of digestion and general nutrition. Not one of these persons may ever suffer from the symptoms chiefly complained of by the others; and doubling his ametropia or increasing the strain by increased use of the eyes fails to produce the other symptoms, even though the particular symptom he does complain of be increased in severity to the point of rendering the use of the eyes impossible.

One patient with a dioptre of astigmia has a chronic blepharitis of years' standing, but has never had a headache in his life. Another patient with the same amount of astigmia comes for headaches that keep her in bed a day each week; but her lids appear, and have always been, absolutely normal. Both are cured by the correcting lenses. To reason that the one suffered no harm from his astigmia because he never had headache; or that the other suffered no harm because she never had blepharitis, all would admit to be very irrational. But to assume, because some people tolerate a moderate hyperopia without symptoms, that therefore those who come with the symptoms will be relieved, although we leave an equivalent amount of their hyperopia uncorrected is at least equally irrational.

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*Lecture delivered at the Philadelphia Polyclinic and College for Graduates in Medicine June 2, 1909.

That patients will not tolerate an altered ametropia thrust upon them by an imperfect correction, as well as they will the ametropia that has developed with their eyes, is a fact that may be observed in many cases. An instance of it so obvious that no one practicing ophthalmology can ignore it, is shown by the over-correction of hyperopia. We meet people with low myopia who have never felt the slightest inconvenience from it. Who have never realized that anyone could see more clearly at a distance than themselves, although such myopia might amount to 0.5 or 1 D. But did any one ever know a hyperope, accustomed to perfectly clear distant vision, to accept an over-correction for his hyperopia without noticing the blurring of vision and complaining of it, even though this over-correction were but one-quarter or one-eighth of a dioptre? If any one thinks that this annoyance from acquired ametropia is confined to the over-correction of hyperopia let him put on a one-quarter dioptre concave lens, or one-quarter dioptre cylinder, placed at such an axis that it shall change without correcting his previous astigmia, or better still, place — 0.25 before one eye and a + 0.25 before the other. The wearing of such lenses for a few hours will convince most persons that the alteration of ametropia, even without any increase in the amount, is annoying and harmful. The effect of astigmia at a different angle, or of an unaccustomed difference between the two eyes, can develop headache in persons quite unaccustomed to it.

Similar effects are produced through the eyes of patients when we prescribe lenses in which the cylinder is placed at the wrong axis, or the difference between the two lenses is not properly adjusted to the refractive differences of the two eyes. Such harm and annoyance is greater when the error is made in the direction of an over-correction; so that the kind of ametropia is reversed. The common teaching to give partial corrections is based, more than on anything else, upon the inaccurate giving of over-corrections for what were intended to be full corrections. If you cannot correct ametropia accurately, by all means give only partial corrections. They will make a great deal less trouble than errors in the opposite direction.

But over-correction is not the only error that can make trouble. Every inaccuracy in the estimation of ametropia will lessen the chance of relieving the patient. Seventy per cent. of my patients who come for refractive errors come wearing lenses that have been given by some one else. And most of these come because such lenses have failed to give relief on account of inaccuracy in the measurement of ametropia. We meet some patients who go from doctor to doctor unsatisfied when the fault is in the expectation or manner of life of the patient; but nine out of ten patients who seek a new correction for ametropia do so because the preceding measurement of their ametropia has been or has become inaccurate. Every patient that leaves one of you for such a cause, and gets relief by a more accurate correction from some one else, works an injury to your reputation more definite and pronounced than other kinds of failure will produce.

One other fact noted by many observers bears upon the importance of accuracy in the measurement of refraction. The low or moderate degrees of ametropia are more likely to cause chronic and obstinate headaches, and other forms of nervous disorder, than are the higher degrees of ametropia. I recall the case of a physician over 6 feet in height and of heavy build, past 50 years of age, in good general health, who suffered from dizziness and nervous dyspepsia; and who was only relieved by the constant wearing of his correcting lenses:

R. + 0.37 $\overset{\frown}{\smile}$ + 0.25 cy.
L. + 0.25 Sph.

On two different occasions within four years he tried leaving off his distance glasses. Each time there was comparative comfort for a few weeks, then gradually increasing dizziness and disturbance of digestion. These symptoms soon passed away again with the renewed wearing of the correcting lenses.

That such low ametropia may cause persistent symptoms suggests that any inaccuracy in the measurement of the refraction that will leave even this amount uncorrected is liable, in a certain proportion of patients, to prevent the relief that they would get from accurately fitted glasses. Were these reasons for accuracy in refraction work better appreciated there would be more attention to certain details of method necessary to the attainment of accuracy.

The measurement of refraction, in so far as it is work for a professional man, is chiefly a question of exactness. Any person can stop at the stand of a street peddler, hold a glass before his eyes and conclude that he sees better or worse with it than he does without. And the peddler can assist by picking the glasses out of the case or even by holding them before the eyes. It has too often happened that something of this kind slightly elaborated has passed as a measurement of refraction in the rooms of the "optometrist" or the office of the oculist. Between it and the skilled diagnosis of ametropia there is a long interval. But the steps that lead from one to the other are almost entirely improvements in accuracy of method.

The first step toward the attainment of accuracy is the checking of results by measurement with different methods. There are a dozen different practical ways of measuring the refraction of the eye. Every one of these is liable to its peculiar errors, only to be eliminated by comparison with the results obtained by some radically different method.

Something additional might be learned regarding the refraction of an eye by subjecting it in succession to every one of the different methods. But by such a course other conditions of accuracy would be violated. Not only will the patients refuse to pay for the indefinite repetition of all these measurements; the interest and endurance of both patient and ophthalmologist fail after a certain time; so that the measurements become progressively less accurate, and the later would only serve to confuse the more accurate results obtained by the earlier tests.

Three methods of high possible accuracy that differ most completely from each other, and therefore tend to correct each other's deficiencies, are the ophthalmometer, the shadow-test, and the subjective test with lenses and test letters. The weak point with the ophthalmometer is that it measures only corneal refraction. Both of the other methods measure the total refraction. The weak point of skiascopy is that it shows too many kinds of refraction at once, the ametropia varying in different parts of the dilated pupil. Both the other methods indicate the refraction of only a part of the pupil. The subjective is weak in that it is subjective, and especially in fixing the meridians and amount of astigmia. Both the other methods are strictly objective and especially suited to the determination of astigmia.

I believe the habitual use of these three methods gives the most accurate determination of refraction. But either one of them can be replaced by some other method without greatly impairing the accuracy of the combined results. The subjective method with test letters at 4 or 6 meters, and lenses, would be hardest to replace. But even this could be replaced by the simple optometer, a convex lens giving an artificial far point, with small test objects that can be brought near or placed farther from the eye.

A general condition of accuracy is this: *accurate physical measurements are only possible when the value or dimension to be measured is fixed.* That is the greatest reason for using a cycloplegic. If a drug is not used to fix the state of refraction, we may avail ourselves of the disposition to reduce the indistinctness of vision to a minimum by the so-called "fogging method." It is because the asymmetry of the cornea is constant during observation that the ophthalmometer gives such definite information; and because the total astigmia remains practically unchanged under the conditions of the test that skiascopy has peculiar value in fixing the meridians and amount of the astigmia, even without a cycloplegic.

The next principle to be observed is that the *contrast must be made as nearly simultaneous as possible.* Very few of us meeting two persons a block apart, who were within an inch of the same height, would be able to say with certainty which was the taller. But stand the two side by side and the difference is perceived by every one. The gradual rise of a line or surface may be entirely imperceptible, although a very small fraction of that rise made suddenly could not be overlooked. So if you want the patient to choose which is the better of the two lenses, his answer will be more definite and more sure to be correct if the change is made instantly.

This, and not mere convenience or economy of time, is the reason for using *supplementary lenses* before the eye; an additional lens held before those already in the trial frame, instead of taking one of these out and substituting another. To pass from one lens strength instantly to another, to pass from one cylinder axis to another instantly, is the method by which we can learn with the greatest certainty and the most minute exactness which lens best corrects the ametropia present. Any method or device that interferes with this *immediate contrast* diminishes the accuracy of the result. It is like the water in the Irishman's recipe for punch: "You take the lemon, and the sugar, and the whiskey, and then every drop of water spoils the punch."

Another essential principle is to *arrive at the correction from both sides.* Make sure that any increase or decrease in the strength, any turning of the axis either way, makes vision worse; or brings out the linear appearance of light in the pupil that indicates uncorrected astigmia; or causes the mires of the ophthalmometer to overlap or separate as the case may be. To follow the rule sometimes laid down, of changing the lens a certain way until it gives full vision, rarely gives an accurate result. You must go on until you have passed the point of full correction, before you can be sure that it has been reached.

SPECIAL TESTS.

With the *ophthalmometer* accuracy depends on seeing distinctly the images reflected from the cornea. The instrument used by daylight has been unsatisfactory principally from failure to properly adjust the illumination. Looking through the telescope we see, along with the corneal reflections of the mires, the iris stroma as a background. If the iris be strongly illuminated the light from it will overpower the light reflected from the cornea (the images of the mires), which will appear faint or be entirely invisible. To bring out the reflected images strongly, so that they will be readily seen and their overlapping estimated with certainty, we must have the mires strongly illuminated and the background in comparative darkness. But feeble light should fall upon the patient's face and iris; as he sits with his back to a window, from which the direct light of the sky falls fully upon the ophthalmometer. The ophthalmometer does not fix the meridians of astigmia with great accuracy, but by sweeping the instrument back and forth, and especially by carefully determining the direction of both the principal meridians, a fair approach to accuracy may be made.

With *skiascopy* we are watching as a test object a little area of light on the patient's retina; seeing how changes of lens or changes of distance influence its appearance and movements. Near the point of reversal this test light area becomes greatly magnified, and correspondingly indefinite at best. To attain accuracy it is necessary to make it bright, small, and as definite as possible. To make it bright we use a brilliant source of light, the incandescent mantel, the acetylene flame, or the electric light. To make it small, and also to give it a definite edge, we use the shade with an opening; or use a very small electric lamp. The opening is made circular so that astigmia may have a chance to determine the shape of the light seen in the patient's pupil. The worst defect with the electric skiascope or retinoscope is that the light used commonly does not give you a point of light, but a line, so that you see in the pupil an appearance of astigmia when no astigmia is present. Or, this line of light overbalances the effect of the astigmia present, and you see the appearance of a band in the pupil at an angle different from that which the astigmia would properly give. You can, by turning your skiascope to different angles, cause the band in the pupil to change its direction. By this maneuver one can ascertain that the band he sees is due to his electric lamp, and not due to astigmia. But the existence of such an appearance adds greatly to the difficulty of using the electric instrument and detracts from its accuracy.

With the incandescent mantel, or a flame used through the opening in a shade, we can diminish the size of the point of light on the retina by diminishing the size of the opening in the shade. But with any diffusion in the eye, as there always is, diminishing the size of the opening diminishes the brightness of the retinal light area. Then diminishing the size of the opening renders necessary diminishing the size of the sight-hole in the mirror; and a very small sight-hole in the mirror is difficult to see through in the dark room. I think the practical limits are: a sight-hole in the mirror of 2 mm., or a little less, and an opening in the shade 3 mm. in diameter.

But the smallness and the definiteness of the light area on the patient's retina do not depend simply on the source of light and the opening in the shade. They depend also upon the refraction of the patient's eye. If this is irregular, or such that a perfect image is not formed on the retina, the light area is correspondingly blurred or distorted. Now in the dilated pupil we always find the refraction near the periphery is irregular and differs materially from the refraction at the center. Hence dilation of the pupil renders the light area on the retina distorted, indefinite and confusing,—impairs the accuracy of the test.

It is worth while to try *skiascopy before using any mydriatic*. In a great majority of eyes the meridians and amount of astigmia can be determined more readily and definitely with the pupil undilated. The importance of this point may be appreciated when we bear in mind that the area of the pupil admitting light varies as the square of the diameter, so that in an 8 mm. pupil the ring of space within 1.2 mm. of the periphery, admits more light than all the rest of the pupil, and this diffused light prevents the accuracy of the test. When necessary the diffusion can be cut down by the pupil stop that I have described. (*Ophthalmic Record*, December, 1905.) But it is of practical importance to make the determination of the astigmia with the pupil undilated.

Of still greater importance are the methods of obtaining accuracy with the *test lenses and test cards;* because this subjective test usually makes the final decision as to the lens required. Although it is a subjective test it can be given much of the significance of an objective test by having a sufficient number of test cards, and requiring the patient, when he says he can see better, to read some additional letters. Following this plan one may escape being misled by the patient's impression that the sight is made better or made worse by a certain change of glass.

Accuracy is also facilitated by making such *decided changes* with the lenses at first as to make it absolutely certain that the error of refraction lies within certain limits. Thus a patient with 1 D. hyperopia, even if of very moderate intelligence, will answer promptly and positively that a convex lens is better than a concave, and where a + 2 D. lens is placed before his eye will, with equal certainty, choose a concave rather than an additional convex held before it. In this way it is established that he has hyperopia of less than 3 D. Most patients will answer with equal confidence when a change of 0.5 D. is made either way; and thus show that the ametropia lies between 0.5 and 1.5 D. Having determined this with certainty, we begin testing to see whether the refraction is really 1 D. or 0.25 D., more or less. Having settled this point, it is time enough, if the vision is normal, to see whether an increase or decrease of one-eighth dioptre is indicated.

In the case of astigmia the decisions of the strength, and the direction for the cylinder are best reached with the astigmic lens. Having placed before the eye the cylindric lens that seems indicated by the ophthalmometer, skiascopy, or other previous test, we proceeded to revise this determination by use of the *astigmic lens* held in front of the lenses in the trial frame. The astigmic lens is mounted in a ring attached to a round handle, so that by a slight movement of the thumb and finger its effect can be instantly reversed. The strength of the cylindric correction is modified by holding the astigmic lens with its axis parallel to the axis of the cylinder in the trial frame. The handle makes an angle of 45 degrees with the direction of the axis. A slight rotation of the handle, reversing the faces of the lens, changes the axis 90 degrees. In one position the astigmic lens adds its strength to that of the cylinder before the eye. In the other position its tends to neutralize the cylindric lens before the eye. The patient, choosing between the two, decides whether he sees better with the cylinder increased or diminished in strength.

If, however, we place the astigmic lens with its axis 45 degrees from that of the cylinder in the trial frame, and then reverse its faces, we get the effect of adding a cylindric lens turned first to one side, and then to the other side. The cylinder in the trial frame, with the astigmic lens, gives a certain combined cylindric effect; and the turning of the astigmic lens from side to side, has the effect of turning the axis of the combination (instantly) from a certain number of degrees one way, to a certain number of degrees the other way. The patient, choosing which is preferred, decides which way the axis of the cylinder should be rotated.

These two uses of the astigmic lens: (a) to test the appropriateness of the strength of the cylinder chosen, and (b) to determine the direction in which its axis should be placed, are to be alternated; and the changes they indicate made in the cylinder placed in the trial frames, until that strength and direction have been found, any change in which will impair the effect of the lens combination, and will impair it about equally whether the change be toward increased strength or diminished strength; or turning the axis in one direction, or in the opposite direction.

The strength of the astigmic lens that can be used with advantage depends on the acuteness of vision that the patient obtains with the combination. With poor vision the changes made must be great, if they are to be certainly recognized by the patient. With better vision a smaller change in the lens effect can be recognized with certainty, and the limits of possible inaccuracy thus diminished. For vision of less than one-half the normal the astigmic lens convex 0.25 D. in one meridian and concave 0.25 D. at right angles thereto will be found most serviceable. When vision rises to about normal, convex 0.12 in one meridian, and concave 0.12 in the other, may be used to attain the greatest accuracy. But it is always better to make a change in the lens unnecessarily great, than to make a change so slight that the patient becomes uncertain, and his answers misleading.

The foregoing pages deal largely with details that are minute, but far from unimportant. The measurement of a refraction, more than most other lines of professional work, illustrates the truth of the saying: "Trifles make perfection, but perfection is no trifle."

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CONJUNCTIVAL INFECTION IN MANILA.*

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The work upon which this paper is founded was done during the months of January and February, 1908, while in the service of the Bureau of Science, Manila, at which time conjunctivitis was prevalent among the prisoners at Bilibib Prison, where my daily routine was the necessary pathological and microscopic work.

Through the kindness of Dr. Shattuck, in charge of the hospital and sanitation work of the prison, and Dr. Christiansen, who was fighting eye infections among the prisoners, I was permitted to make slides and cultures from 22 of the 25 cases in the accompanying table.

In this paper we have made the diagnosis of Koch-Weeks conjunctivitis in all cases where the cultures gave characteristic bacilli, even when we were not able to make the diagnosis from the smear. Also we have left "undetermined" all cases in which we have failed in the culture.

In Nos. 5, 6, 7, the first culture was made in acid media, because no alkaline media was at hand, but transfer was made to alkaline media in two hours, therefore, in those cases, while the cause must have been B. Koch-Weeks or some other organism easily killed by acid, we have left the cases undetermined.

In No. 18, there was a luxuriant growth of micrococcus luteus (Kohn), but we do not think that it was the cause of the inflammation, but that probably the real offender was overshadowed by the luxuriant growth of the saprophyte, hence we consider that case also as undetermined

In all, 21 cases of conjunctivitis were examined. Out of this number, B. Koch-Weeks was isolated (9) times or about 42.90% ; Staphylococcus pyogenes (aureus) alone, (2) times

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***Read before the American Society of Tropical Medicine, April 10, 1909.**

No.	Discharge		Conj. red	Pain	Smear showed	Stain used	Culture	Remarks.
	Pus	Serum						
1	—	+	+	Slight	Not made	—	B. Koch-Weeks	....
2	+	+	+	+	Bacilli intra- and extra-cellular............	Dilute C. F.	B. Koch-Weeks	....
3	—	+	+	+	Baclli seen, not seen intra-cellular...	" "	Staphylococcus pyogenes aureus	....
4	—	+	+	Slight	Small bacilli, no cells..	" "	—	Acid media
5	—	+	+	Slight	Bacilli seen, but not intra-cellular.......	" "	B. Koch-Weeks	....
6	—	+	+	Slight	Negative.......	" "	—	Acid media
7	—	+	+	+	Bacilli seen, but not intra-cellular........	" "	—	Acid media
8	+	+	+	+	Negative.............	" "	—	....
9	+	+	+	+	Bacilli seen, but not intra-cellular........	" "	Staphylococcus pyogenes albus	....
10	+	+	+	+	Bacilli seen, but not intra-cellular-.......	" "	B. Koch-Weeks	....
11	+	+	+	+	Bacilli intra- and extra-cellular.....	" "	B. Koch-Weeks	....
12	—	+	Slight	Slight	Small bacilli, no cells..	" "	—	....
13	—	+	+	Slight	Negative.............	Giemsa	B. Koch-Weeks	....
14	—	—	Slight	Slight	Negative.............	Giemsa	—	....
15	—	+	+	Slight	Negative (lost)........	—	B. Koch-Weeks	....
16	+	+	+	+	Cells only............	Dilute C. F.	Staphylococcus pyogenes aureus albus also	....
17	+	+	+	Slight	Intra- and extra-cellular bacilli..........	Dilute C. F.	B. Koch-Weeks	....
18	—	+	+	Slight	Cocci.	Methyl. blue	Micrococcus luteus (Kohn)	....
19	+	+	+	Slight	Bacilli intra- and extra-cellular.....	King's stain	—	....
20	—	+	+	+	Negative.............	" "	B. Koch-Weeks	....
21	+	+	+	+	Bacilli intra- and extra-cellular.	" "	Staphylococcus pyogenes aureus	....

No.	Trachoma case	Diagnosed by	Smear	Stain	Culture
22	Trachoma case	Dr. Christiansen	Negative	Giemsa, King's, Dilute C. F.	B. trachus
23	Trachoma case	Dr. Christiansen	Negative	Giemsa, King's, Dilute C. F.	Negative
24	Trachoma case	Dr. Stafford	Negative	Giemsa, King's, Dilute C. F.	Aspergillus flavus
25	Trachoma case	Author	Negative	Giemsa, King's, Dilute C. F.	Negative

or about 9.86% ; Staphylococcus pyogenes with albus (1) time or about 4.43% ; Staphylococcus albus alone (1) time or about 4.43% ; Micrococcus luteus (Kohn) (1) time or about 4.43% ; negative stain and culture (3) times or about 13.30% ; smear apparently positive but culture negative (6) times or about 26.60%.

In case (24), we thank Dr. Stafford, Chief of the Philippine Civil Hospital, for the courtesy of allowing us to take cultures both before and after the operation for trachoma. While in this case the culture showed aspergillus flavus, we do not think that so common a fungus could be the cause of trachoma, but that its presence was only accidental.

From No. 22, B. trachus, *nov. spec.*, 1909, was isolated, but on account of lack of evidence, we do not claim it as the cause of trachoma but publish this as a help to any one who can carry the work farther, and prove it harmless or pathogenic as the case may be.

Since many have failed in the effort to cultivate the cause of trachoma, it seemed best to use special media. The Koch-Weeks bacillus grows best on 5% peptone alkaline agar; the gonococcus grows best in the presence of hydrocoele fluid or some similar body exudate. With these two things in mind we decided to try media in which B. Koch-Weeks grows best after having added a drop or two of blood from the ear of the patient from whose eye the culture was taken. This blood we secured sterile on a platinum loop and smeared over the surface of the agar. Cultures made on acid media were sterile as were also those made without the addition of the fresh blood. Later rabbit blood was tried with as good success as human blood, but clear serum and exudates were not tried.

B. trachus is a small polymorphous organism about 1 in. long and generally about 1/3 as broad as long, without spores, or granules, non-motile, stains poorly with methylene blue, but well with dilute carbol-fuchsin, Wright-Romanowsky and King's stains. It grows slowly on 5% peptone alkaline (blood-smeared) agar in small white colonies, which become visible to the eye on the second day and reach their maximum size (about 1 mm.) in 5 or 6 days.

It remains alive on such media for at least a month, but if planted on 5% peptone alkaline agar does not appear to grow at all, yet lives in this condition for at least (10) days as may be seen by adding fresh blood when the colonies appear after two days.

No positive results were obtained by animal inoculation; the conjunctivae of rabbit, guinea-pig and monkey (Macacus philippinensis) showing no change a month after inoculation.

There has been a report of successful inoculation upon the conjunctiva of higher apes, but there were none of these to be had, and we did not think human experimentation justifiable. Therefore the pathogenicity of this organism is still unsettled.

There is little chance for reference to literature, here, therefore other authors will please pardon me for not giving exact references as all such reference must be done from memory.

Gov't. Serum Laboratory, Phrapatoom, Siam.

REFLEX ASTHENOPIA FROM INTRANASAL PRESSURE.*

MATTHIAS LANCKTON FOSTER, M. D.,

NEW YORK.

Attention is directed at the present time more than it has been in the past to the association of pathological conditions in the eye and in the nose. Perhaps this is to be the era in which the symptomatology of these associated conditions is to be recognized, and the prophecies of those who have believed that the next advance in ophthalmology would be through the nose are to be verified. The subject is by no means new; occasional papers in medical literature have called attention to it, the earliest to my knowledge by Dr. Gruening of this city in 1886, but each in turn failed to impress what I have long believed to be the fact, that the ophthalmologist needs to be able to examine the noses of his asthenopic patients intelligently, to recognize lesions that may cause the symptoms of which those patients complain, and either to relieve them himself, or to send them with accurate diagnoses to some one who possesses more skill in operative intranasal surgery I believe that there are many patients who suffer chronically from asthenopia and wander from one ophthalmologist to another for years without relief, in spite of careful correction of refractive errors and adjustment of muscular imbalance. As a rule they present no symptoms to direct attention to the nose, except this persistent asthenopia, and therefore pass from hand to hand without detection of their real trouble. This absence of nasal symptoms leads the patients to question the possibility that a fault in the nose is the cause of their pain and sometimes their incredulity has been upheld by their physicians. Hence many sufferers have declined an intranasal operation when suggested. It is a matter of surprise to me that so many have felt sufficient confidence in the surgeon to submit to what they knew must be an annoying, and perhaps painful, procedure with so little assurance of success as he could honestly give.

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*Read before the New Rochelle Medical Society, June 14, 1909.

In January, 1894, I published in the *Manhattan Eye and Ear Hospital Reports,* the first case of this nature that came under my observation, and urged the importance of a careful examination of the nasal cavity and of the accessory sinuses in all cases of obstinate asthenopia. I will reproduce the history of the case here because I have found it to be typical of its class:

Mrs. B., aged 31, by occupation a seamstress, appeared in Dr. Pomeroy's clinic, January 6th, 1893. She complained of headache, and of severe pain in the eyes, more particularly in the right, both greatly aggravated by any attempt to sew or read. There was no pathological condition in either eye except some chronic conjunctivitis. At the time she was wearing glasses, O. D. + 1 D. cyl. ax. 90°, O. S. + 1 D. sph., which had been prescribed for her elsewhere some months before.

Examination with the ophthalmometer showed, O. D. + 1.50 D. ax. 100° or 10° with the rule, O. S. + 1.50 D. ax. 90° or 180° with the rule. With the test lenses, O. D. 20/30; 20/20 — with + 1 D. cyl. ax. 100°, O. S. 20/30 — :20/20 — with + .75 D. cyl. ax. 90°. There was binocular single vision for distance and for the near point. Examination of the muscles showed orthophoria, adduction 10°, abduction 8°, sursumduction 4°. Glasses were accordingly prescribed, O. D. + 1 D. cyl. ax. 100, O. S. + .75 D. ax. 90, with a lotion of the saturated solution of boric acid for the conjunctivitis.

A week later she reported no improvement. Re-examination gave the same result. The conjunctivitis was then treated for six weeks with no benefit.

In March, the patient was referred to Dr. O. B. Douglas, to determine whether any nasal trouble could account for the maintenance of the asthenopia. Under cocaine, marked contact was found between the right middle turbinate and the septum. The turbinate was found to be eburnated, and several operations were necessary to relieve the contact by removing portions of the bone with the alligator cutting forceps. During these operations the pain was felt entirely in the right eye. After the first operation, the pain in the eye was very much better but later it returned.

On April 29th, ten days after Dr. Douglas' last operation, the patient was transferred to the care of Dr. T. J. Harris. On this day there was a contact between the right inferior turbinate and the septum, as well as a synechia between the anterior end of the middle turbinate and the septum. The latter showed some granulation tissue and behind it was retained secretion. The contact was relieved under cocaine and a pledget of cotton wet with acetotartrate of alum was introduced. On the following day there was only a little contact.

May 2nd. No contact. Mono-chloracetic acid applied to granulation tissue.

May 3rd. Headache same as before any operation. Synechiae had again formed and were treated.

May 18th. Eye gives but little trouble. No synechiae. Two spots quite close above and below. Removed a small piece below.

May 20th. Removed a large portion of right inferior turbinate with snare. Eyes much better.

May 22nd. Eyes give but little trouble.

June 1st. Absolute freedom from all trouble in use of eyes by sewing. The right side of nose is now perfectly open.

July 7th. I again examined her eyes. There had been no sick headache since the last operation healed, but the right had felt a little strained for the past week when at work. Under homatropine, I found O. D. 20/50; 20/20 + w + .75 D. sph. ○ + 1 D. cyl. ax. 100°. O. S. 20/50; 20/20 — w + .75 D. sph. ○ + .75 D. cyl. ax. 90°, and prescribed glasses accordingly.

Since 1894 I have seen this patient many times. In 1906, twelve years after the operation, she developed 1 degree of hyperphoria which has been permanently relieved by a prism 1° base up before her left eye. Glasses for near work have been added because of presbyopia, but at no time during these sixteen years has there been a recurrence of the severe asthenopic symptoms for which she sought relief.

I want to call particular attention to the statement of this patient that she felt no pain in her nose during the operations, but suffered acute pain in her eye. This suggests that the asthenopia was analogous to the earache dependent on a decayed tooth, so often met with in a healthy ear, and the probability that the analogy is correct is increased by the fact that in both cases the parts involved are innervated by closely related branches of the fifth nerve.

The offending area in the nose may be quite small, as is shown in the following case. A lady 44 years of age, was sent to me by a practitioner accustomed to do a certain amount of intranasal work, because she complained of nausea. headache and asthenopia when reading. She had been wearing + 2 D. for distance, and + 3.50 D. for near work. I think it was in this case that my attention was caught by a chance remark that headache came on whenever her head was bowed as if she were reading, even when she was not using her eyes. I examined her nose, although she assured me that she had never had any trouble there; found a slight but firm point of pressure between the right middle turbinate and a spur of the septum, and wrote a note to her physician advising him to attend to it. He replied that he had examined her nose, that there was no fault there and that her troubles were positively confined to her eyes. As the result of three examinations I prescribed for distance R. + 1.75 sph. ○ + 1.25 cyl. axis 165°; L. + 2 sph. ○ + .25 cyl. axis 45°; and for reading R. + 3.25 sph. ○ + 1.25 cyl. axis 165°; L. + 3.50 sph. ○ + .25 cyl. axis 45°. The previously uncorrected astigmatism seemed to be an ample explanation of the asthenopia. but the patient returned with it unimproved a month later. This time I succeeded in impressing her physician sufficiently so that he sent her in consultation to a rhinologist who operated with success and after another month the patient came to thank me for having been able to recognize the cause of her suffering.

A lady 45 years old, consulted me because of pain and "dizziness" in her eyes whenever she used them for near work. She had 1 D. of hypermetropia in her right eye, and 1.25 D. in her left. Her near point with Jaeger No. 1 was at 8½ inches with R. + 1.75; L. + 2, and these glasses were prescribed for reading. Four months later she returned because her symptoms persisted in spite of the glasses. I examined her nose, though she protested that she knew it was all right, and found bony contact between the right middle turbinate and the septum which I persuaded her to allow me to cut away. The pain of the operation was felt mostly in the eye and the pressure caused by a pledget of cotton wet with a solution of acetotartrate of alum produced a considerable degree of pain in the eye. The result was eminently satisfactory to both the patient and myself.

I think that this is the only case in which I have been successful in the attempt to persuade a patient who had no ocular error worse than presbyopia and a slight degree of hypermetropia that the painful symptoms were due to an unfelt lesion in the nose rather than to an undetected fault in the eye. I do not wonder at this, the idea must have seemed ridiculous to the patients and it was natural that they should wish to secure other advice, but in this case at least the removal of the unfelt lesion in the nose effected a complete relief to the ocular trouble. A diagnostic test on which I place considerable reliance is to press on the nasal mucous membrane at the site of the bony contact and to have the patient state whether the pain so produced is or is not of the same character as that for which relief is sought. When the pain is said to be of a different character I doubt whether the asthenopia is due to the intranasal pressure in that particular case, but when it is said to be the same, and the other causes of asthenopia have been excluded, the removal of the pressure seems to me to be indicated. In this case, as in the first, almost all the pain incident upon the operation and the dressings was felt in the eye.

Mr. H., 34 years old, consulted me in February, 1903, because of headaches and blurring of vision. Complete relief was given at first by + .50 sph. ⊃ + .50 cyl. axis 180° over each eye, but in November of the same year the patient returned with the statement that after a short time his headaches recurred, though with less frequency and severity, and that they had gradually grown worse until they were as bad as ever. The glasses were changed to + 1 sph. ⊃ + .50 cyl. axis 180° and his headaches ceased for about six months. Then they recurred again, gradually increasing in severity. Examination with and without homatropine proved the glasses to be correct. The correction of 1° of left hyperphoria with a prism was of benefit for only a few days. Examination of the nose revealed a large deviation of the septum to the right with a thick vertical ridge impinging on the right middle turbinate. The left turbinate was very large and nearly filled the concavity formed by the deviation of the septum. In spite of the very abnormal condition the patient was positive that he had never had trouble in his nose more than "a cold now and then, not very often, just the same as everybody else." A rhinologist was called in consultation who confirmed my diagnosis and advised an extensive operative intervention. Three days later the patient consented to have me saw away the ridge on his septum with the understanding that the larger operation might be necessary if this one failed to relieve his symptoms. The relief obtained by the removal of the pressure on the turbinate was positive and complete, so that he declined further intervention. A year later he returned because the headache had returned and he could not see so well. A point of contact between the apex of the deviation and the turbinate was found and removed. The glass now required, both with and without the influence of homatropine, was + 1. sph. ⊃ + .25 cyl. axis 180°. Two years later, Feb., 1908, he returned because his eyes were bothering him slightly. His astigmatism had disappeared and his glasses were changed to R. + 1 D.; L. + 1.25 D. He had had no headaches although he had been using his eyes very hard.

In this case a highly intelligent business man presented symptoms not only readily explainable by his refractive error, but actually relieved for a time by its correction. The subjective symptoms caused by the abnormal condition in his nose were so slight that it was difficult for him to accept the statements of myself and of the consultant, and to consent to a minor intervention. I was convinced that the pressure was causing pain and therefore urged that it at least be removed. The relief obtained proved that the pressure had played a part in the production of his headache and asthenopia, though it was not the only, or perhaps the principal factor. The pressure on the turbinate certainly was the active agent rather than any of the grosser intranasal deformities. A point that deserves special notice is that after this pressure had been relieved the astigmatism gradually grew less until it disappeared, although there is nothing to prove that the astigmatism was caused by, or was in any way dependent upon it.

In 1904, Mrs. B. consulted me. She had been under treatment for asthenopia for years. For several months she had been under the care of a specialist in a neighboring city who had prescribed glasses containing prisms and had finally sent her to this city to have her muscles cut by a prominent surgeon. At a later period she told me that the latter tested her muscles after no attempt to correct her refraction, found a condition which demanded operation and said that the only wonder was that she had not been rendered insane by her muscular imbalance. Instead of reporting for operation on the following morning, as directed, she came to my office where, in ignorance of the facts just stated, my findings were as follows: Patient wearing spherocylindric glasses combined with a prism before each eye. Ophthalmometric reading O. D. .50 D. with the rule axis 90°; O. S. 1.50 D. with the rule axis 90°; R. V., 20/30 +; 20/15 with + 2.75; L. V., 20/200; 20/20 + with + 4 sph. $\overset{\frown}{\smile}$ + 1.25 cyl. axis 135°. With these glasses before the eyes the screen test failed to elicit any apparent movement of an image at 20 feet. The adduction was 25°, the abduction 12°, the sursumduction of each eye 2°. With the phorometer the exophoria was 4°. The patient declared that she felt very comfortable with the glasses on and wished to try them before she submitted to any surgical intervention. Two days later she reported that she had spent two hours on the previous day at the Metropolitan Museum of Art, that her head felt badly when she went but did not grow worse, and that her headache had recurred on the morning of the second day after reading for two hours. Examination with the phorometer showed 2° of exophoria, no hyperphoria. With the screen test there was no apparent movement of an image at 20 feet. Examination of the nose revealed a slight deviation of the septum to the right, bony pressure between the right lower turbinate and the septum and an adhesion between the middle turbinate and the septum. Intervention was declined at first, but the patient returned two months later and had the points of pressure removed. Two years later she reported that she had had no return of her asthenopia or headache.

This was a very puzzling case. The compound hypermetropic astigmatism at an oblique axis in one eye alone seemed to be an ample explanation of the asthenopia of the patient and doubtless was responsible for a part of her symptoms. She had worn prismatic glasses for some time and without the proper correction of her refractive error had a considerable degree of hyper-exophoria. But when she wore her proper glasses the hyperphoria disappeared, there was orthophoria by the screen test and the exophoria shown by the phorometer was reduced one-half after the glasses had been worn two days. After that time every attempt to add a prism caused discomfort in the eyes. I would like to call particular attention to the fact that in this case the exophoria could be detected only with the phorometer, an instrument to which the patient was accustomed, and with which she had been trained to expect a deviation of the images, while with the screen test, to which she was not accustomed, no evidence of exophoria could be obtained. This is in line with observations I have made in other cases which seem to indicate that the muscles of the eye can be trained to simulate imbalances that are not actually present.

I do not wish to multiply cases; those I have mentioned seem to be typical and of sufficient variety to emphasize my point, which is, that intranasal pressure is responsible for a considerable proportion of the cases of obstinate asthenopia that go from one ophthalmologist to another and get infinitesimal changes made in their glasses, or perhaps have slight muscular imbalances treated, without obtaining the relief they seek. I am a strong advocate of the accurate correction of refractive errors, I believe that the great majority of the cases of asthenopia are to be cured in that way alone. A certain proportion of patients have true muscular imbalance, after their refractive errors have been corrected, which causes their asthenopia and must be removed if they are to be cured. But I maintain that the ophthalmologist's duty is not done when he has investigated the eye alone for the cause of an obstinate asthenopia. I have little patience with the view that specialism is exclusivism, that the specialist is not called upon to investigate other portions of the body for the origin of reflex symptoms in the organ to the study of which he has devoted himself. Hence I claim that it is the duty of every ophthalmologist to render himself competent to investigate the condition of the nose in these obstinate cases. My own experience during the past fifteen years inclines me to the opinion that the ophthalmologist should be able not only to recognize, but also to relieve these conditions, for the reason that it is natural for the rhinologist to lay more stress upon conditions that appeal to him as of more importance to the hygiene of the nose than upon others which from his standpoint are rather trivial. In two or three cases that I sent to rhinologists before I began to operate for myself, operations were performed elsewhere in the nose than at the place indicated by me, for good reasons from the standpoint of the rhinologist doubtless, but with no relief to the symptoms on account of which the patients submitted to operation Once or twice the patients were returned to me with the statement that my diagnosis was correct, but that the lesion was so slight that it could be doing little if any harm and that it would be inadvisable to intervene. From the standpoint of the hygiene of the nose these gentlemen were undoubtedly correct, but that standpoint did not, and could not, except through blind reliance on my opinion as an ophthalmologist, take into account the reflex asthenopia produced. In effect I asked these gentlemen to become blind operating machines, to act not in accordance with their trained judgment of the conditions in the nose, but in accordance with my judgment of the relations between the nose and the eye, relations of which they knew nothing and I knew little. I cannot blame them that they followed their own judgment instead of mine, had our positions been reversed I would have done the same. Yet, that must be the position of the rhinologist who would undertake to operate in the nose under the guidance of an ophthalmologist. In other cases I received from the rhinologist an account of the pathological conditions found in the nose, of the operations performed, of the after treatment, and of the final results, except with regard to the ocular symptoms. Sometimes that portion of the history would be summed up in the words "Did not the patient return to see you? I told him to." But patients have a way of leaving when they think that we are through with treatment and frequently do not care to make what seems to them a superfluous visit to the doctor. Aside from these considerations, which are not of great moment, it does not seem wise that a surgeon should undertake to perform an operation the indications and results of which he cannot himself comprehend as fully as any other surgeon. It does not seem just to make an operating surgeon responsible for an operation performed as a machine under another physician's guidance, yet an operator always must be responsible for his work. Therefore I believe that every ophthalmologist should receive such training in rhinology as will render him competent to treat every case of associated ocular and nasal trouble that comes to him for relief, and that every rhinologist who wishes to operate for the relief of ophthalmological troubles of any kind should study ophthalmology. Such a course is reasonable and presents no insuperable difficulties.

616 Madison Ave.

REPORT OF A CASE OF APPARENTLY IDIOPATHIC RECURRENT VITREOUS HEMORRHAGE.

Nelson M. Black, M. D.,

Milwaukee, Wis.

This communication is for the purpose of suggesting an additional factor in the treatment of a disease or condition, which as a rule does not readily respond to any routine method of treatment. The writer is well aware that the improvement obtained in one case does not afford very much of a basis from which to draw conclusions; but if one individual has been helped, possibly another may be by the same means.

Mrs. L. G., an American, a married woman of 27 years, came to the office for consultation December 21, 1907. The patient was a well developed, fine looking woman. She stated that while embroidering December 18, 1907, a black cloud suddenly came before left eye; next morning everything had a dull gray shade. No pain in eye, and could observe nothing abnormal in external appearance of eye. Had a brother and sister who died of tuberculosis and one aunt on mother's side, and several relatives on father's side died of tuberculosis.

Past History.—At seventeen years of age she had inflammatory rheumatism; was very ill for two months. For a good many years she has had heart trouble of an indeterminate nature; is very nervous at times and then heart is worse. Is being treated for endometritis.

Ocular Examination.—Both eyes were absolutely normal in appearance, pupils equal and responded to light equally. Patient wore correction, O. D. + 1.00; O. S. + 1.00 $\overset{\frown}{\smile}$ — .25 90°. Vision without glasses = O. D. 6/6, O. S. 6/30. Vitreous O. S. was somewhat hazy and contained a long irregularly saculated clot extending from up and in, to down and out, somewhat crescentric in shape, the convexity being down and in. Details of fundus were but little obscured and to all appearances perfectly normal. No bleeding point could be observed; no increase of tension. Atropin, dionin and hot compressing were prescribed locally. Sodium iodide given internally with instructions to keep the bowels freely open, avoid any lifting or straining and to return in one week.

December 26, V. O. S. 6/20. Vitreous still hazy, clots absorbing. Continue same treatment.

January 3, 1908. Condition of media about same, somewhat more cloudy and vision much reduced. V. = 6/60. Stop atropin, continue rest.

January 14, 1908. V-O. S. = 6/15.

February 2, 1908. V-O. S. = 6/6.

February 18, 1908. One week after last visit noticed vision becoming blurred. Can see oozing from the neighborhood of superior nasal branch of central retinal artery, but it does not seem to come from the artery or vein, only in that neighborhood. V. O. S. = 6/12; gave calcium chloride internally.

March 2, 1908. Vision improving; fundus still somewhat obscured by vitreous haziness.

March 25, 1908. Letter in which patient states she has been confined to bed for two weeks and thinks she had another hemorrhage two days after she went to bed.

May 7, 1908. V. O. S. = 6/7½; stopped sodium iodide as it disturbed stomach.

May 22, 1908. Had a slight hemorrhage while out driving.

May 23, 1908. While standing in a store O. S. suddenly became blind. V. O. D. = 6/6, V. O. S. = light perceptions down and in. Has had some pain in eye and complains of a great deal of pain along left side of spine. No increase of tension. *Has figured out that each hemorrhage has appeared just midway between menstrual periods.* Continue same treatment.

June 16, 1908. Just at end of menstrual period, V. O. S. = 6/30. Vitreous full of many large clots. Patient states she has been taking digitalin all the time and has a great deal of pain in region of heart and is in a very nervous state over domestic and financial troubles. Sent to Dr. H. V. Ogden for examination.

HEART EXAMINATION—"Apex beat in 5th interspace one inch inside the nipple line. Both sounds heard clearly except at the apex where the first sound is "blurred." Alone with the sound is heard a murmur, systolic in rhythm, soft and of longer duration than the first sound This superimposed murmur is heard from the third left costal cartilage out as far as the anterior axillary line." Blood pressure (Riva-Rocci Wide Cuff) at 11.50 a. m. 126 mg.

June 25, 1908. V. O. S. light perception, vitreous full of large floating opacities.

June 26, 1908. Blood pressure at 11.00 a. m. 128 mg.

June 27, 1908. Has at times no light perception. Vision at other times, movement of hands down and out. With pupil widely dilated, periphery of fundus to nasal side can be seen and fresh bleeding can be made out at upper nasal portion of fundus well forward toward the ciliary body. The blood does not seem to come from any vessel but seems to ooze through the retina. Blood pressure at 11 a. m. 125 mg.

July 1, 1908. Same area of bleeding noticed well forward to nasal side of fundus. Calcium lactate given in 10 grain doses three times daily, to be increased to 15 grains at mid-menstrual period.

July 14, 1908. Received letter stating calcium lactate had to be discontinued as it disagreed with stomach.

July 17, 1908. Has been confined to bed on account of gastric disturbance and a very scant and painful menstruation. Had another vitreous hemorrhage while in bed.

July 18, 1908. Blood examination made by Dr. F. J. Gaenslen: R. B. C., 5,020,000; W. B. C., 8,100; polymorphonuclear, 71% ; small mononuclear, 17% ; large mononuclear 8% ; eosinophiles, 4% ; hemaglobin, normal; red cells good color and contour.

Looking through dilated pupil with ophthalmoscope is like looking against a blank wall. Only at extreme periphery to nasal side can any red fundus reflex be made out. No light perception. Tension of O. S. somewhat less than of O. D.

July 24, 1908. Urine examination, Dr. Fitzgibbon. Yellow, clear; acid; sp. gr. 1018; no sugar; no albumen; no indican; no microscopic examination made.

Gynecological examination. Ulcerated cervix; congested uterus; endometritis.

Dr. Fitzgibbon gave nitroglycerine gr. 1/100 twice daily and potassium iodide gr. 5, three times daily.

Galvanic electricity was suggested with negative pole to eye and positive pole to nucha, with the hope of causing disintegration of blood clots in the vitreous, hoping to prevent formation of contracting bands of fibrin and connective tissue which might result in retinal detachment, 10 volts at 1½ to 3 Ma were given for fifteen minutes daily.

August 18, 1908. Wrote she could not take the potassium iodide any longer as it disagreed with her. "That the black cloud that had been hanging before her eyes so long, disappeared and everything looks milky white, but could not see anything through it, that the eye felt as large as a dollar and as though it were full of sticky stuff." Advised the negative pole of the galvanic current be applied to the eye saturated with 20% solution of the potassium iodide.

August 20, 1908. Writes black cloud came back again very suddenly; is afraid the eye is bleeding again or else clots have appeared from somewhere. Has been taking the galvanic treatment daily.

September 21, 1908. Writes there has been pain all over left side of body, notices bright flashing in eye when taking electric treatments, complains of pain in both eyes after reading.

September 29, 1908. Writes that while she cannot distinguish any objects with eye, the opacities seem considerably thinner, and that both eyes will ache hard for an hour or so and then feel better. There is a feeling of stiffness and fullness about the left eye.

December 12, 1909. Writes that six weeks ago began to suffer severely with pain in left shoulder which radiated to other joints on left side. Nothing gave relief, so Dr. Lindsay, her family physician, suggested she try massage. This was given by a so-called magnetic healer (Nov. 9). Two weeks of treatment was given by a "woman healer," each treatment seemed to take all her strength; the "woman healer" then suggested that she take the treatments from her husband, and these she stood much better. After two and one-half weeks' treatment (Nov. 22), she noticed "a shadow before the lame eye" and has noticed an improvement each day. November 25, can fix a light and can tell when a person stands before her.

December 14, 1908. When looking straight ahead can see wheels turn and can make out large objects. Was ill for two weeks after Christmas. Eyes ache and feel strained if she uses them and complains of diplopia.

January 12, 1909. When reading sees two pictures unless left eye is closed.

January 23, 1909. V. O. S. = 6/60 and one letter on 6/30 line. O. S. diverges 6° exophoria and 3° left hyperphoria at 6 m. 25° exophoria and 1½° L. H. at 33 cm. Ophthalmoscope = red reflex all over fundus, just below equator of eye two grayish clots and below these several larger ones. Vessels visible from the periphery up, in and out, almost into the disk which is obscured; says she does not think she has had a hemorrhage since she commenced use of galvanic current, but that *no marked change* in eye was noticeable until after three weeks' massage, when the change was very noticeable and the improvement from then on very rapid.

February 8, 1909. Wrote that vision was quite cloudy and that there was a brown look spread all over eye; she felt as if a large, but slow hemorrhage was appearing. Dr. Lealand examined eye but could see no fresh hemorrhage, but remarked that the vessels were very congested. Commenced the galvanic current again which had been given up during massage treatments.

February 23, 1909. Writes eyes are about same as when seen January 23rd; the electric treatments seem to clear up the eye. Complains of a great deal of pain in both eyes, worse in left, especially after any close use of eyes. Is having galvanic treatments daily and general massage twice a week.

March 1, 1909. V. O. S. = 6/20 one letter of 6/15 line. Eyes are parallel and has binocular single vision. Fundus details much clearer, three large grayish opacities in anterior portion of vitreous chamber and considerable fine debris. Disk clearly seen. Has considerable pain in eyes after close use. Advised galvanic treatments on alternate days.

March 15, 1909. Is taking psychic suggestion from a Miss Ben Oliel and says she is feeling very much better physically; has learned to relax and rests very much better. The treatments consist of, putting the patient to sleep by suggestion and "impressing upon the subconsciousness that the circulation of lymph and blood throughout the body is to improve and become perfect; that the clots in the eye are to be absorbed; that the digestion and assimilation of food is to improve and the heart to act steadily and regularly."

V. = three letters on 6/15 line.

March 27, 1909. Writes she is feeling fine and can read large print in newspaper, also that "Miss Oliel's treatment seems so perfectly foolish I do not see how it can help my eye, but if it has done nothing else it has been worth a great deal to me to learn to relax and rest."

April 5, 1909. Writes that she was blind in O. S. again and commenced galvanic treatments.

April 12, 1909. Eye is improving.

April 25, 1909. Eye is still improving, can again read large print; has stopped galvanic treatments and is taking the general massage.

RESUME.

The first hemorrhage was December 18, 1907. There was a gradual improvement and four months later vision was 6/7½. Sixteen days later the eye suddenly became blind and remained so for five months when the movement of large objects before the eye could be made out, five days later could make out large objects, as a person standing between herself and a window. Two months later vision was + 6/60 and has been gradually improving to 6/15 at the present time.

Nothing in the clinical history of the patient could be picked upon as an absolute etiologic factor. The family history is suspicious of tuberculosis.

There was a peculiar murmur heard at the third left cartilage, but not indicative of any valvular lesion. The alimentary tract was somewhat disturbed and there was more or less constipation. The kidneys were normal, blood pressure normal, no evidence of anemia. There was mild endometritis. The patient looked the picture of health but was decidedly neurasthenic.

There was only one time when it was possible to discover the source of bleeding when it seemed to come from the upper nasal quadrant of the eye ground; the character of the hemorrhage at that time seemed to be an oozing, very small in amount and did not appear to come from any vessel in the vicinity.

The first hemorrhage must have been considerable in amount, however, as the patient describes it as a black cloud, suddenly coming before the eye. This must have been from a retinal vessel, for had it come from the chorioid in the amount described, it would have certainly caused a retinal detachment.

Following the early hemorrhages, the free blood in the vitreous was rather quickly absorbed and the vision but little interfered with; large floating clots free from any attachment, however, were left.

Fox and Batroff drew the following conclusions in their paper, "*The Relation Between Retinal Hemorrhages and High Arterial Pressure,*" (*Ophth. Record,* October, 1908):

"First.—A large proportion, 80° per cent, of retinal hemorrhages occurs in individuals suffering from temporary or permanent high arterial blood pressure; due to causes enumerated (diseases in which hypertension is the rule; chronic interstitial nephritis 40%; arteriosclerosis 27%; and chronic parenchymatous nephritis 13%.)

Second.—This excesive intravascular pressure is apparently the most frequent exciting cause of this hemorrhage.

Third.—Venesection has proven of value not only in reducing dangerously high pressure, but in acting as a powerful stimulus to a speedy absorption of the clot."

Permanent or temporary high arterial pressure from disease can be excluded in the present case.

As Krause (ANNALS OF OPHTH., 1908) says, "recurrent hemorrhages into the vitreous humor occurring in adolescence, is an interesting disease both on account of extreme rarity and the mystery surrounding its occurrence.

"The etiology is unknown, though it is generally supposed to be connected with auto-intoxication due to intestinal absorption, which causes sudden changes in blood pressure. The sudden increase or decrease in blood pressure causes rupture of the chorioidal veins which pour their blood into the vitreous humor. The prognosis is guarded, some eyes recoving full sight with more or less vitreous opacities, while others may be lost by glaucoma, retinal detachment, etc."

Krause has gone into the literature carefully and gives extracts of cases reported by Graefe, Eales, Neiden, Schweigger, Pannas, Koenig, Zieminiski, Kries, Hutchinson and Mayweg.

With the exception of Schweigger, the above authors state that the disease rarely occurs in females, and Eales accounts for it by stating that probably females are saved from retinal hemorrhages by their menstruation. The occurrance of the hemorrhages in the case reported by the writer at the midmenstrual period seems to add confirmation to Eales' opinion.

The frequency of occurrence of the hemorrhage in the left eye, Eales considers more than accidental and "thinks that the left carotid artery coming direct from the aortic arch, and the greater length and more indirect course of the innominate vein which joins the other almost at right angles may cause a slightly higher tension in the capillaries on this side, and so account for the greater frequency of hemorrhage on this side."

The only treatment which seemed to bring about an improvement in the eye was the use of the galvanic current, the negative pole to the lid and the positive to the back of the neck, together with general massage. The patient states she is sure there was never a recurrence of the bleeding while using galvanism.

It is stated that the cathode is a vasodilator producing hyperemia and an increase of bleeding, also that it tends to liquefy tissue. The negative pole was used upon the affected eye for the latter purpose; i. e., to prevent if possible the organization of the clot, the formation of connective tissue and consequent detachment of the retina and contraction of the globe.

Coleman (*Wood's Therapeutics*) reports a case of intraocular hemorrhage in right eye with only light perception, unimproved by three months' previous treatment, which recovered normal vision in nine months and with no recurrence of hemorrhage in 3½ years, in which the negative pole was applied to lids.

The rapid improvement made after the use of general massage can only be attributed to the improvement in blood and lymph circulation.

The good effects of venesection reported by Fox could hardly be expected in this case as the blood pressure was never found above 125 mg.; the hemorrhages were also of very short duration and a noticeable amount of blood escaped each time.

The cessation of the hemorrhages under galvanism together with the improvement in vision of the affected eye precludes at the present time any thought of ligation of the common carotid as suggested by Derby.—(*J. A. M. A.*, July 13, 1907.)

128 Wisconsin St.

FLAT SARCOMA OF THE UVEAL TRACT AND ANGIOSARCOMA OF THE ORBIT.*

HAROLD G. GOLDBERG, M. D.,

PHILADELPHIA.

FLAT SARCOMA.

Briefly, the clinical history of the case is as follows: The patient, a male aged 52 years, was struck in the right eye about eight or ten years ago; following this accident the eye became inflamed, but soon grew quiet so that nothing more was thought of it. About two years ago the vision in the right eye began to fail, followed a year later by pain of a dull or sharp shooting character, very much worse at night and radiating from the temple to the occiput. At the time of his admission to the Wills Hospital the right eye was blind; the lens was cataractous, tension + 1, the pupil 3 mm. in diameter, there was a pigment deposit in the anterior chamber, the result of an old hemorrhage, and there was a corneal opacity in the lower, outer quadrant. The vision in the left eye was 6/15, and the examination of this eye was negative. Clinical diagnosis: *Secondary glaucoma.* The eye ball was enucleated and sent to the laboratory, where it was hardened and divided through the horizontal meridian. Macroscopically there were no evidences of an intraocular tumor. The specimen was sectioned and stained to prepare it for microscopic study, which examination revealed the following: The entire uveal tract was found to be infiltrated with spindle sarcoma cells; from the papilla they passed through the chorioid, the muscle layer of the ciliary bodies, including a portion of this structure, and out over the stroma of the iris, replacing it where it lies in contact with the posterior surface of the cornea. The ciliary bodies are so thoroughly destroyed that not even their form remains; at their base, on one side of the section, the growth cells seem to cease until the vortex veins are reached; here they begin again and continue posteriorly. On the opposite side of the section they are continuous throughout. This is probably due to the manner of sectioning, some portions of the chorioid being free, one such area being included in these sections. The iris lying in contact with the posterior surface of the cornea has, of course, obliterated the anterior chamber. The corneal layers are all intact, the epithelium is somewhat papillomatous in character. and some of the basement cells are degenerated; running through the substantia propria are several strata of proliferated connective tissue cells. These are especially prominent in the posterior layers. and seem to be the fixed elements. Near the periphery of the cornea there is some new blood vessel formation. There is a pretty general atrophy of the chorioid. most of the stroma cells having been replaced by the cells of the growth and the vessels obliterated by pressure and proliferative changes. especially in the intima. The form of the vessels. however. remains. so that in some cases they have the appearance of endothelial plugs. The retina is degenerated. its nerve fibre layer is thickened, and it has undergone cystic change. especially in the internal layers: here the ganglion cells have been destroyed and the cyst cavities are long longitudinally instead of transversely, as they are usually seen. Between the retina and chorioid, in the neighborhood of the ciliary processes, are seen several hyaline bodies. There are only small areas of retinal detachment and most of these are in the region of the nerve. so that they may not be pathological. The vitreous chamber is entirely empty, its shrunken remains lying spread out over the internal surface of the retina. Somewhat posterior to the equator and to the nasal side of the eyeball. there is seen in section a vortex vein filled with non-pigmented sarcoma spindle cells. It is a broad vein, narrowing toward its anterior end. which is lost in the section. and becoming broader at its posterior end where it empties into the orbit. On the opposite side of the section is a smaller vein carrying the same character of cells. which it seems to take from the posterior layers of the chorioid. and from this point in the chorioid the sarcoma tissue begins to extend posteriorly. the coat gradually increasing in thickness until the papilla is reached: here it abruptly thickens and fills in the cup of the nerve with the cells of the growth. At this point a sharp line of demarkation is seen, formed by the lamina cribrosa, leaving the nerve and its lymphatics, including the sheath spaces, free of sarcoma cells. It is generally believed that these cases represent a very rare cause in the production of glaucoma, and that they are probably highly malignant and exceedingly dangerous. It will be seen from the pathology that before any clinical evidence of the nature of the case was made manifest, the growth was practically beyond the control of the surgeon. We might suppose that the same cause operating in the production of the glaucoma, viz: interference with the blood supply of the eye by extension through the blood channels, would almost certainly indicate that the growth cells have either reached some extra-ocular structure or will reach it before the surgeon is consulted. Moreover, after the eye ball is enucleated, and is opened, and studied, macroscopically, at the time of the operation, there is nothing to suggest the real nature and danger of the case, which might influence the operator in his subsequent treatment or in his prognosis. There have been only some thirty odd cases of this condition reported, and I believe the reason for this is probably not that the form of growth is so rare, but because many of these cases escape the eye of the pathologist; they are thrown away or otherwise destroyed before they reach him. The obliteration of the anterior chamber described above, probably played an unimportant part in the production of the glaucoma, but was artefact, the glaucoma being primarily due to the interference with the blood supply. There is still some difference of opinion as to the layer of the chorioid from which sarcomata spring. It is generally believed at the present, time, that as a rule, pigmented growths spring from the external layers, and non-pigmented from the chorio-capillaris. In this case it would be reasonable to assume that, owing to the early extension through the blood channels, the cells taking the course of least resistance, this growth would spring from the external layers, in spite of the fact that it is non-pigmented. There is no evidence that it came from the internal layers; the choriocapillaris is everywhere intact, and certainly in a growth as extensive as this, some part of it at least would be visibly destroyed, even in a few sections. The excessive endothelial proliferation, the early extension, the presence of hyaline bodies and the course of the cells (in their exit from the eye-ball) through the lumen of the vessels and not the peri-vascular lymph spaces, all inclines, I believe, toward establishing the endothelial origin of these growths. The second case, I report, because it seems appropriate at this time to speak of the possible termination of the first case with a history such as he would probably present at another hospital, if our knowledge had been incomplete. The history of the case is somewhat vague; he applied at the Wills Hospital and was assigned to Dr. William Zentmayer's clinic. It was found that he had a small spongy growth on the posterior wall of the socket which had appeared two days before, and according to his statement, five years after the enucleation which had been performed for an injury. Further than this the history is in doubt, as it could not be learned how long before the enucleation the injury had been received. A diagnosis of papilloma was made and the specimen was sent to the laboratory. A microscopic examination revealed the following: The substance of the growth is composed of large free blood masses and well marked blood columns. The columns or tubes are surrounded by sarcoma cells in the form described as mantling. The blood spaces are abundant and without definite vessel walls and the dichotomous branching is conspicuous. In the blood spaces are seen pigment clumps, most of them cellular in size and shape; in spite of this cellular character, however, I would look upon the pigment as hematogenous and not autochthonous, as no actual cell body can be made out, and because of the variety in size. Most of the blood is in a late stage of degeneration and the corpuscular elements cannot be seen. The free margins of the growth are more abundant in sarcoma cells than the center; in the former they vary in form, spindle cells appearing, but round cells predominating. The spindle cells are probably the result of diverse sectioning. There are some areas of degeneration, mostly hyaline change, and some few polymorphonuclear leucocytes. I would look upon the growth as highly malignant. I think these two cases are interesting in their possible relation to each other; in both there is a history of traumatism, which is about as likely a cause of sarcoma as our knowledge of the subject would indicate, and you will observe that there was nothing in the history of either to suggest the true diagnosis. We might reverse the cases with the same ultimate result. Unfortunately, in neither case was it possible to learn any subsequent history, although repeated efforts were made in both.

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*Read before the Wills Hospital Ophthalmic Society, Jan. 5, 1909

1905 Chestnut St.

THE CHOICE OF OPERATION FOR IRIDOTOMY.*

McCLUNEY RADCLIFFE, A. M., M. D.,

PHILADELPHIA.

Haab, in his book on "Operative Ophthalmology," states that: "It may be asserted with confidence and with entire honesty that an ophthalmic surgeon, be he ever so experienced, never is certain when he begins an uncomplicated operation for cataract how it will end." He might have added with equal truthfulness that no one can predict the after-results of a cataract operation, no matter how skillfully the operation is performed, or how carefully the after-treatment is carried out, for the unexpected will at times happen; and, instead of a resultant clear pupil, we find one occluded with a lymph membrane, or the iris so distorted as to completely obliterate the coloboma.

While such results are comparatively rare in proportion to the total number of cataract operations, they are still of sufficient number to warrant the adoption of a distinctive line of treatment—one that will at the same time combine the elements of safety, ease of execution, and yield the best visual results.

The end to be accomplished is, of course, the making of a central artificial pupil. In this we are limited, according to the experiences of the most conservative operators, to three operations, viz., Bowman's, De Wecker's, and the recently published operation of Ziegler—the V-shaped iridotomy with a knife-needle.

Bowman's operation has practically fallen into disuse, owing to the difficulty of its execution and the additional opportunity that two corneal incisions afford for the introduction of infection and the exit of fluid vitreous.

The De Wecker operation is the one that is most generally used, and frequently with good results, although there are inherent elements of danger in it which cannot be eliminated. It necessitates a large corneal opening, thus affording an easy exit for fluid vitreous and a correspondingly easy entrance for infection, in addition to the extensive traumatism to the eye.

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*Read before the American Ophthalmological Society, New London, Conn., July 14, 1909.

The knife-needle operation possesses all the elements of a perfect operation; ease of execution, safety, and the minimum of traumatism to the eye; and, as a consequence, the visual results are often superior to those of the older operations. It possesses all the advantages of the De Wecker operation without sharing its disadvantages.

Ziegler, in his exhaustive "History of Iridotomy," has well stated the chief advantages of iridotomy with the knife-needle as "ease of incision, the lack of traction on the ciliary body, freedom from post-operative inflammatory reaction, the avoidance of opening an eyeball which may contain fluid vitreous, the lessening of the tendency to iris hemorrhage from lowered tension, and the avoidance of the nebulous scar which often follows a large corneal incision in old inflammatory eyes."

The utility of the Ziegler operation can best be illustrated by brief histories and diagrams of a few cases, which, without such operative interference, would have been absolute failures.

REPORT OF CASES.

Case I.—J. M., male, aged seventy-eight years. First seen on April 14, 1905. R. E., mature senile cataract. Light perception and projection field normal. I admitted him to St. Joseph's Hospital, and on May 29, 1905, did a combined extraction. There were no complications at the time of the operation; but a few days later a severe iridocyclitis developed, which resulted in almost complete occlusion of the pupil, a minute semilunar opening, about 2 mm., remaining at the upper margin of the coloboma (Fig 1). I

CASE I.

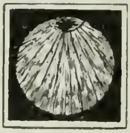

Fig. 1.—Distorted iris, almost obliterating coloboma.

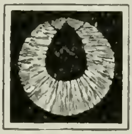

Fig. 2.—V-shaped iridotomy, with pyriform pupil.

postponed further operative procedure until the late autumn.

On November 17, 1905, I did a V-shaped iridotomy, going well down into the iris tissue, and the membrane opened up into a pear-shaped pupil (Fig. 2), which has remained permanent.

The test for glasses on January 5, 1906, gave the follownig result: R. E., $S + 7.50 \supset C + 3.50$ ax. 15° = 20/20, partly. Four months later the refraction had changed to R. E., $S + 8 \supset C + 3$ ax. 15 ° = 20/16. With a $S + 4$ added, reads J. No. 1 fluently. Has worn this correction with comfort ever since.

This was a typical case, as the iris was well stretched and consequently resilient, the pupil opening readily and the apex of the flap dropping down and the base rounding.

CASE II.—S. L., aged seventy years, carpenter. R. E. mature senile cataract. Admitted to the Wills Hospital February 14, 1908. On February 17, 1908, I did a combined extraction, which was smooth and uneventful. Iridocyclitis developed on the fourth day. Extensive and dense adhesions formed between capsule and iris, resulting in a small, pear-shaped, and completely occluded pupil (Fig. 3). Vision reduced to light perception.

CASE II.

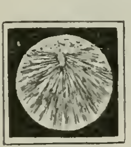

Fig. 3.—Occlusion of pupil with displacement.

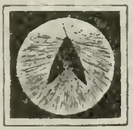

Fig. 4. — Iridotomy, showing shape of pupil immediately after incision.

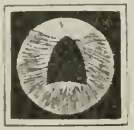

Fig. 5. — Iridotomy, ultimate appearance of pupil.

On April 3, 1908, a V-shaped incision was made in the iris, the pupil spreading out as shown in Fig 4. Fig. 5 shows the final shape of pupil. A test for glasses on June 9th gave the following result: R. E., $S + 11 \supset C + 50$ ax 30° = 20/20 partly.

With a $S + 3$ added for working, could read the small divisions on carpenter's square, and with $S + 4$ read J. No. 1. The ultimate aphakic change nine months later gave the following result: R. E., S + 11.50 ⌒ C + .50 ax 180° = 20/20 partly.

This patient has been able to follow his trade as a carpenter since his first glasses were ordered, April, 1908.

Case III.—Wm. C., aged eighty years, farmer. Admitted to my clinic at the Wills Hospital on November 11, 1908, with mature senile cataract of right eye. On November 16, 1908, the senior house surgeon did a combined extraction. A violent iridocyclitis developed within three days, which subsided after vigorous antiphlogistic treatment, leaving the coloboma filled with thickened capsule and adherent iris, as shown in Fig. 6.

On January 27, 1909, I made a V-shaped incision of the iris, as shown in Fig. 7. There was considerable reaction following the iridotomy, which subsided under ice, atropin, and leeching. He was discharged on March 2, 1909, with the following temporary correction for distance: R. E., S. + 9.50 ⌒ C. + 3° ax. 180° = 20/70. He is to return later for final correction.

CASE III.

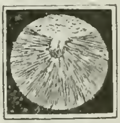

Fig. 6.—Occluded and distorted pupil.

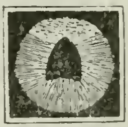

Fig. 7.—Iridotomy, with resultant pupil.

Case IV.—T. M., aged eight. Admitted to Wills Hospital on February 24, 1909. Was struck on R. E. two days previously by flying piece of wood, causing an irregular penetrating wound of the cornea, extending from the equator down and into the sclerocorneal margin. The contused iris was caught in the wound; pupil elliptical; small hypopyon; lens opaque.

On March 26, 1909, the soft lens cortical was removed. The eye did well, but owing to the attachment of the iris to the cornea and the capsule of the lens, the pupil was gradually drawn down into a mere slit, filled with thickened capsule and lymph, as shown in Fig. 8.

On April 12, 1909, I made a V-shaped incision in the iris tissue, with the result shown in Fig. 9. Fig. 10 shows the ultimate shape of the pupil. Owing to the nebulous condition of the cornea, the correcting lens, S. + 12, only gives 6/200, but the enlarged pupil gives him protective vision to the right side.

CASE IV.

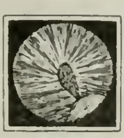

Fig. 8.—Pupil occluded, and iris caught in wound of cornea.

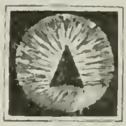

Fig. 9. — Iridotomy, immediate result.

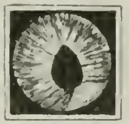

Fig. 10. — Iridotomy, final result.

Case V.—W. C. C., aged fifty-four, carpenter. Admitted to the Wills Hospital November 24, 1908, for mature cataract of right eye. A combined extraction was done, with slight loss of vitreous owing to the straining of the patient at the close of the operation. Three days later he had a hemorrhage in the anterior chamber, probably the result of striking his eye during the night. Iridocyclitis followed, which yielded to treatment, and he was discharged December 19, 1908, to return later for the secondary operation. He was readmitted on April 13, 1909, with a condition as shown in Fig. 11. Three days later I made a V-shaped incision in the iris, as shown in Fig. 12. Fig. 13 illustrates the final appearance of the pupil. With S. + 12.50 ⌒ C + 1.50 ax. 150° = 20/30, partly. With S + 3.50 added, he reads J. No. 3.

CASE V.

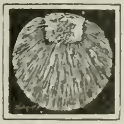

Fig. 11. — Dense pupillary membrane and distortion of iris.

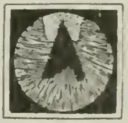

Fig. 12. — Iridotomy, showing shape of pupil after incision.

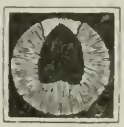

Fig. 13. — Iridotomy, ultimate result.

CASE VI.—Mrs. S. R., aged sixty-seven, admitted to my clinic at the Wills Hospital on March 24, 1909, for mature senile cataract. Light perception and projection field normal.

On March 26th I did a combined extraction, some cortical matter remaining. Four days later an iridocyclitis developed, which subsided under the usual treatment of atropin, ice, and leeching, but left eye as shown in Fig. 14.

CASE VI.

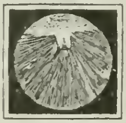

Fig. 14.—Occluded pupil in a soft eyeball.

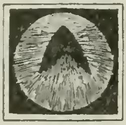

Fig. 15.—Iridotomy, immediate result.

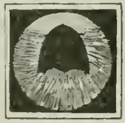

Fig. 16.—Iridotomy, final result.

On April 28th I did a V-shaped iridotomy with the immediate result as depicted in Fig. 15. The present appearance of pupil is shown in Fig. 16.

It is too early to give the visual result, as there was some inflammatory reaction following the operation, which is rapidly subsiding.

I have found the V-shaped incision equally applicable and satisfactory in operations on thickened capsules, as is well demonstrated by the following case and illustrations:

CASE VII.—C. K., aged thirty-eight, mechanic. Admitted to Wills Hospital January 3, 1908. Struck by piece of steel in L. E. three years previously. Lens cataractous. Vision, fingers at 3 feet; contracted visual field. R. E.,

CASE VII.

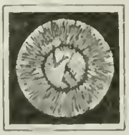

Fig. 17.—Thickened capsule.

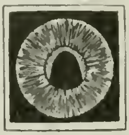

Fig. 18.—V-shaped capsulotomy, showing resultant pupil.

vision failed during December, 1907; counted fingers at 3 feet. Projection field normal. No history of injury. Lens swollen and cloudy. No fundus details could be seen. Small mass suspiciously like foreign body imbedded in lens at the equator, near nasal margin. Radiographs showed foreign body in L. E., but none in R. E.

On January 8, 1908, I operated on right eye, and removed the soft lens cortical, and with it a small foreign body 1½ mm. by 1/4 mm., and very thin. Two weeks later the eye presented the appearance as shown in Fig. 17, and I then made a V-shaped incision in the thickened opaque capsule, with the result as illustrated in Fig. 18. The visual test gave the following result: R. E., $S + 14 \asymp C + 1$ ax. $180^\circ = 20/16$. With a $S + 3.50$ added, reads J. No. 1 fluently.

REMARKS.

The requisites for the successful performance of this operation of V-shaped iridotomy are four:

1. A properly shaped and perfectly sharpened knife-needle. I have adopted Ziegler's modification of the Hays knife-needle (Fig. 19) as the one that best meets all requirements.

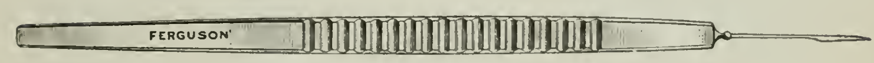

Fig. 19.—Ziegler's knife-needle.

2. All pressure must be absolutely avoided in making the incisions.
3. A gentle sawing motion. In this, and the avoidance of pressure, lies the real secret of success in the operation.
4. Perfect artificial illumination is an absolute necessity, and particularly so in capsulotomies, where the membranes are filmy or web-like in structure.

After a somewhat extensive experience in performing this operation during the past four years I unhesitatingly recommend it as the operation par excellence for iridotomy and capsulotomy, as the safest, easiest of execution, and, above all, as the one that yields the best visual results.

I am indebted to my chief assistant at the Wills Hospital, Dr. Geo. Robinson, Jr., for the excellent drawings which he has made of the cases here illustrated.

1812 Chestnut St.

REPORT OF A CASE OF COMPLETE, HARD CATARACT, WITH EXTRACTION, AT THE AGE OF FOURTEEN.*

HUGO A. KIEFER, A. B., M. D.,

LOS ANGELES, CAL.

Complete, hard cataract is seldom found under the age of thirty years. Reports of cases under this age, especially up to fifteen years, are very meager. The following case, therefore, is of interest on account of its rare occurrence, as well as on account of the obscurity of its etiology.

The patient, R. H., American by birth, age fourteen years, was brought to my office December 27. 1902, presenting the following conditions: He was struck in the right eye with a piece of wood about four hours previous. With the exception of a moderately sharp, stinging pain lasting only a short time after the stroke, he suffered no inconvenience.

A large, straw colored, apparently hard lens, occupied the anterior chamber; very slight hyphemia, having its origin in a scarcely visible rupture of the iris: slight pericorneal injection; no tenderness on pressure: a mere suggestion of increased tension; no light perception; the lens was easily movable by pressure on the eye-ball.

Atropine was instilled, and the patient ordered to bed for rest and preparation for operation.

December 28, 1902. The eye was quiet and in good condition for operation. Under mydriasis the upper portion of the lens had become tipped back behind the iris, the lower portion still occupying the position in front of the iris. A general anesthetic was given and the lens, 7 1/2 mm. in diameter, was extracted without difficulty through an incision involving the superior half of the limbus. Under ordinary treatment the patient made an uneventful recovery. There was some hemorrhage in the vitreous, which obscured the fundus completey for a while. When this became absorbed there was revealed a slightly atrophic disk, a healed rupture of the retina extended from the temporal margin of the disk upward and outward a little over a disk's diameter. The whole retina appeared atrophic.

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*Read before the Eye, Ear, Nose and Throat branch of the Los Angeles County Medical Society, December 7, 1908.

The exact details of the fundus could not be made out on account of the haziness of the media, and was also hindered by the existence of a complete posterior synechia, with organized exudate and a contracted pupil.

March 16, 1903. The patient presented the final appearance just reported, with the addition of a few small, flaky, membranous masses floating in the vitreous.

The lens, which presented all the appearance of senile cataract, was 7 1/2 mm. in diameter. It seemed to be of the same consistence throughout as the ordinary senile cataract, and bore no evidence of a lamellar formation.

The past history is indistinct and uncertain. At one month of age the patient had thrush, being very sick and suffering with convulsions at the time.

At two and a half years of age he had whooping-cough, which lasted about five months, and from which he nearly died.

Just after that he suffered from inflammation of the stomach and bowels, and during this sickness had little ulcers in the mouth, and on the tongue, and on the eye mentioned, the latter becoming very much inflamed. According to his mother's statement, "this spot or ulcer seemed to be inside the eye and covered the pupil." He also had very weak ankles when a baby, and had to wear braces. As near as his mother can remember, he became totally blind in this eye when three years of age. The other eye was normal, 15/15 V. when last I saw him. Unfortunately a history of his ailments during the first three years of his life could not be obtained from the physician in charge of the case at that time. But apparently we have, in the history the mother gives, the underlying cause, viz: rickets, with malnutrition of the lens.

Congenital cataracts are usually white in color and soft in consistence. A total cataract at birth may be either soft or have gone on to softening of the cortex, with a hard center dropping to the bottom of the capsule, as in Morgagnian cataract.

How, then, can we have formed at the early age of the case under discussion, a complete, hard cataract? The theory of Norris seems to explain this question quite satisfactorily. If there is a disturbance of the lenticular nutrition during fetal life, while the direction of the lens fibers is axial, and as concentric fibers are added to them with a like disturbance of nutrition going on constantly, and this process is continued after birth, there would be produced a hard cataract, without the soft intervals as found between the lamellae of the ordinary lamellar cataract.

ANGIOID STREAKS IN THE RETINA, WITH THE REPORT OF A CASE.*

WILLIAM ZENTMAYER, M. D.,

PHILADELPHIA.

References to this condition in literature are still few, a recent writer (Pagenstecher) having collected 10 cases, to which should be added one by Oellers, illustrated in his *"Atlas of Rare Conditions of the Fundus."* No case, to my knowledge, has been examined anatomically, so that our views concerning its nature are conjectural, and the theories thus far advanced have not been convincing.

The following case has many interesting and suggestive features:

T. Y., aged thirty-three years, tailor, had good health until two years ago, when he became ill with typhoid pneumonia, which confined him to bed for two weeks and incapacitated him for work for two months. Before this illness he weighed 140 pounds, but since then never more than 125 pounds. He is married and has one healthy child two years old. His wife has had no miscarriages. His father died an accidental death; his mother is living. He uses tobacco and malt liquors in moderation. There is neither history nor evidence of syphilitic infection. As in all other reported cases, the history of our patient seems to disclose nothing that has bearing upon the eye condition.

In November, 1908, he came to St. Mary's Hospital complaining of dimness of vision in the right eye which had set in suddenly four weeks previously. There is a dendriform ulcer of the cornea of the right eye, otherwise the external conditions of the eyes are normal. Vision of R. E. = 6/10; L. E. = 6/6. The visual field showed slight contraction for form, more pronounced for the right eye, in which there was also a horizontal, oval scotoma extending on either side and just beneath fixation. The examination of the urine

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was negative. The blood count was normal. The plasmodium was not found.

Ophthalmoscopic Examination.—R. E. Media, all but cornea, clear. Disk round and slightly overcapillary, with a dense pigment conus and a sharp-cut scleral ring out. Surrounding the disk there is a pale zone which to the nasal side is grayish white. Extending from the margin of this zone there is a system of branching and anastomosing pigment bands. These originate principally from near the upper margin of the disk, and anastomosing form a coarse mesh over the upper inner part of the fundus. A finer streak begins beneath the inferior nasal artery and, passing below the disk, reaches the macular region. In general they taper toward the periphery of the fundus, where there is a retinochorioidal disturbance, manifesting itself in a mottled reddish-brown broken zone which is broadest and most pigmented beyond the region of the macula and absent in the inferior nasal periphery. The streaks have a jagged contour, their appearance having been well described by de Schweinitz as resembling a mole track. They vary in size from once to thrice the diameter of a vessel of the second magnitude. The color is pretty uniformly black, but in places it is chocolate brown with islets of bright red.

In the macular region, below the fovea and below the streak which courses in that region, there is an irregular, horizontal, triangular, fresh hemorrhage. A section of the pigment streak is here broadened and displaced downward, there being a whitish area of equal breadth and length along its upper border. Above this there is a small oval hemorrhage, apparently in connection with a retinal venule.

L. E. Disk is round and overcapillary. The scleral ring is complete. A dense pigment conus surrounds the temporal margin. The inner and lower margin of the disk is embraced by a grayish-yellow crescent about one-third the diameter of the disk in width. It and the disk are bordered by a band of pigment from which extend into the fundus similar streaks, coming off at equal distances from one another except at the lower outer margin. Above, down and in, and to the outer side two such streaks converge and meet at a short distance from the disk in broader bands which course and taper toward the equator. A broad pigment band which extends nasalward from the disk is interrupted by an oval patch of superficial retinochorioidal atrophy, in the center of which is a bright red spot; beyond this the band is continued and tapers off toward the periphery. At equidistances within the streak are five or more bright red islets. The periphery of the fundus shows retinochorioidal disturbance similar to but much less extensive than that of the right eye. (See Frontispiece.)

To summarize: In both eyes there is a system of ramifying and anastomosing pigmented streaks which extend outward into the fundus from a similar band which surrounds a crescent of grayish-yellow retinochorioidal disturbance encircling the disk. They lie beneath the retinal vessels and taper toward the periphery of the fundus, which is the site of marked retinochorioidal changes. The color of the streaks is in general black, but in places there are islands of bright red color.

The points of interest in this case are: (1) The conformity of the arrangement of the bands with that of the other reported cases. (2) The extensive retinochorioidal changes at the periphery. (3) The interruption, in its course, of one of the bands by a small superficial area of disturbance of retinochorioidal pigment (L. E.). (4) The presence of a hemorrhage in intimate relation with one of the streaks (R. E.).

The first point is of interest because it shows that, whatever be the nature of these bands, they have the same location, the same general course and arrangement, and a similar contour and color in nearly all cases.

The second point is of interest because it is possible that a causal relation exists between the striae and the peripheral fundus lesion, whether they are the product of inflammation or of metamorphosed blood.

The third point is of interest because, if the interpretation of which this lesion is susceptible, of a rupture with extravasation of the contents of a vessel, is correct, it lends support to the more recently expressed view concerning the possible nature of these streaks: that they represent a system of new-formed vessels developed in the course of a chronic retinochorioiditis (Lister). The fourth point is of interest because it is the only fresh hemorrhage in either eye, and that in its vicinity there is a pre-existent broad pigment streak.

It is unnecessary to review the different theories that have been presented to explain this interesting condition, or to enter into a discussion of the various ingenious explanations of how extravasated blood may assume this arborescent arrangement, as these are well known to you, but it may be of value to call attention to the more recent views which associate these streaks with blood-vessel formation.

Oellers concludes that the pigment streaks originate through hematogenous pigmentation of the walls of preexisting small retinal vessels and capillaries. He describes one of the pigment streaks in direct continuation with a retinal vein. His case was probably reported without knowledge of Lister's findings. Pagenstecher, after analyzing the different theories, accepts as the most tenable explanation the hypothesis put forward by Lister.

An important contribution bearing on the pathology of angioid streaks in the retina has been made by Lister. This author, in examining sectioned eyes macroscopically, came upon two showing pigment streaks in the substance of the retina. The first was an eye removed because of iridocyclitis and secondary glaucoma following cataract extraction. The anterior half showed the changes consequent upon ordinary iridocyclitis. The retina showed distinct streaks in its substance. These were in places pale and in places deeply pigmented. They lay external to the retinal blood-vessels and internal to the chorioid. Microscopic sections showed, besides great degeneration of the retinal elements at the part corresponding with the most marked streak, the retina was detached, and here and there were seen deposits, both on the external surface of the detached retina and in its substance, which were partly granular and party cellular and contained pigment. In this deposit, in several places, were well-marked blood-vessels, containing unmistakable red blood-corpuscles. Their walls were in places undergoing calcareous change.

In the second instance the eye was staphylomatous. Macroscopically there was pigmentation of the retina similar to retinitis pigmentosa, and occurring also in branching streaks, one of which passed to the margin of the disk. Besides degenerative changes in the external layers of the retina, in places corresponding with pigmented streaks, were well-marked obliterated blood-vessels of new formation. They had clearly defined walls, which were pigmented and had undergone calcareous degeneration with blocking of the lumen.

Lister says that, while these specimens are of a different class from the collected cases of angioid streaks, they have interest in showing: (1) That a new system of blood-vessels may occur in the deeper layers of the retina; (2) that these vessels appear to be the essential factors in a system of pigmented striae similar in level, and in many ways in appearance, to those seen in angioid streaks, and, this being the case, there seems to be fair justification for putting forward the suggestion that angioid streaks are also associated with the formation of new vessels in the retina. Lister advances, as a possible hypothesis as to the cause of their appearance, that, in the first place, some chronic inflammatory change takes place in the retina; and, secondly, that vessels penetrate into this chronically inflamed tissue in the same way that vessels make their way from the optic disk into exudate or hemorrhage into the vitreous. The vessel walls become pigmented or undergo calcareous degenerative changes, accounting for the color of the streaks and the glistening patches seen in their course, while the presence or absence of exudate around the vessels, or degeneration of the surrounding retina, accounts for the presence of the broad white bands running with the streaks. He thinks it quite likely from the above hypothesis that hemorrhages of the retina may be derived from the newly formed vessels.

If we examine the reported cases with a view to determine whether there are any ophthalmoscopic changes tending to support the hypothesis of Lister, we find that there was in many cases a whitish zone about the papilla suggestive of a retinochorioidal disturbance, and in several cases macular changes indicative of either active or quiescent inflammation of the chorioid and retina. In several instances there were retinochorioidal changes at the periphery (Pagenstecher, Walser Plange, and the author), and in most cases there were pigment disturbances, aside from the streaks, in the fundus. In two instances the streaks were interrupted by an area presenting the appearance of a hemorrhage, but which closer examination convinced the observers was the underlying chorioidal vessels. In my own case the interruption has all of the appearances of having been due to a rupture with extravasation of blood and subsequent absorption. In de Schweinitz's case the streaks resembled a system of obliterated vessels, slightly elevated.

In Knapp's case the primary color of the streaks was in portions red, but finally it was black or dark brown throughout.

While the facts accumulated are insufficient to justify definite conclusions, it would seem to the author that they point to the streaks being pigmented vessels, the vessels being either of inflammatory or of congenital origin.

1819 Spruce St.

HEREDITARY BLINDNESS AND ITS PREVENTION.

CLARENCE LOEB, A. M., M. D.,

ST. LOUIS, MO.

References to four hundred and ninety-six cases of hereditary blindness.

(Concluded from the July Number.)

APPENDIX B.

GENERAL DISEASES.

I. Andrews. (11)

The mother had bilateral dislocation of the lens, microcornea and ptosis. Her 2 daughters had aniridia bilateralis.

II. Beers. (31)

Knew several families where most of the members, for several generations, suffered at a certain period of life with amaurosis. "Special attention is deserved by a family whose female members as far as the III generation became completely blind as soon as the menses ceased; on the other hand, all who had given birth to children were free from this condition. Moreover, the male members of this unfortunate family, all of whom as well as the females had very dark eyes, without exception showed a tendency to amaurosis, though no one was actually blind."

III. Bellarminoff. (32)

The mother had hemeralopia during pregnancy. 1 sister died blind at the age of 55. 1 maternal cousin blind. The patient had retinitis pigmentosa and glaucoma right eye, less pronounced left.

IV. Berry. (37)

Mother coloboma of the lids of both eyes; 1 daughter coloboma of the lids of right eye; 1 daughter normal; 1 maternal uncle coloboma of the lids, probably traumatic.

V. Bessonet. (38)

Mother and 2 sons hemeralopia without retinal changes.

VI. Best. (39)

Korectopia is frequently associated with ectopia lentis, and is usually inherited.

VII. Best. (40)

In 8 members of a family, there was a hereditary affection of the macula, 6 times unilateral and 2 times bilateral. In another family, 31 out of 59 members had sundry eye affections.

VIII. Best. (41)

Patient had enophthalmus; his paternal grandmother had same.

IX. Blessig. (44)

2 sisters glaucoma simplex. 2 brothers and 1 sister retinitis pigmentosa; 4 other children normal.

X. Bollinger. (50)

One-third of all cases of tuberculosis can be shown to be hereditary. The chief cause of leprosy is heredity. 8%-17% of carcinoma is inherited. Obesity, chlorosis, rickets and gout are hereditary. Especially in the domain of mental diseases does heredity play an important role. Hemophilia shows the highest degree of heredity of all inherited diseases, and is accompanied by an average childship of 9 as compared to the normal of 5.

XI. Breitbarth. (52)

2 children of normal parents had ectopia pupillae.

XII. Brown. (57)

All the members of a certain family gradually became blind about the age of 16. In the 3 following generations, certain ones also became blind.

XIII. Burckhardt. (61)

Quotes several authors on the heredity of color blindness.

XIV. Chelius. (67)

Parents normal. 4 children became blind at the age of 9 years.

XV. Cohn. (69)

In 100 cases of color blindness, the same condition was found 3 times in the father, 13 times in 1 brother and once in 2 brothers of the patient.

XVI. Cutler. (78)

Patient had night blindness. His father had glaucoma and his mother had cataract. A maternal uncle gradually became blind and 1 of his daughters was born blind.

XVII. Demours. (87)

(A) A man had very little vision in right eye. 4 daughters had little or no vision in their right eyes. His son and the latter's children had good sight.

(B) A woman had bilateral amaurosis. Her daughter lost the sight in one eye at the age of 32 from the same cause, and the other eye was saved only by careful treatment.

XVIII. Deutschmann. (93)

Experimented on the eyes of a male and female rabbit. 1 out of 6 offsprings had phthisis bulbi. Another had chorio-retinitis disseminata. The same male and another female who had been experimented on had 1 offspring with bilateral coloboma of the chorioid and iris.

XIX. Dumont. (102)

Found heredity 58 times in 1168 cases of blindness =5.8%.

XX. Filiatow. (113)

A family of 3—4 generations, 21 members of which were born blind. They were all children of some female member, the children of the male members having normal eyes.

XXI. Fleischer. (116)

A family with myopia, red-green blindness, glaucoma and congenital amblyopia.

XXII. Fuchs. (129)

Father phthisis bulbi due to blenorrhea; son microphthalmus same eye.

XXIII. Galezowki. (136)

2 brothers with retinitis punctata albescens and hemeralopia.

XXIV. Giglioli. (140)

Believes that the white races are descended from negroes affected with hereditary complete albinism, examples of which were seen by Albertis on a voyage to New Guinea.

XXV. Golowin. (145)

7.1% blindness congenital.

XXVI. Groenouw. (155)

Congenital conditions must be distinguished from inherited ones. Inheritance of disease usually takes place directly from parent to child, rarely indirectly by atavism. The disease is not necessarily congenital, but may appear at a later period of life. Consanguineous marriages with resulting blindness of offspring probably act by a doubling of some hereditary taint, which a single line would have been unable to transmit. The following eye diseases are inheritable: irideremia; cataract; ectopia lentis; retinal diseases; hemeralopia; optic nerve disease; albinism; color blindness; glaucoma; errors of refraction; microphthalmus; hydrophthalmus; anomalies of the lids and muscles of the eye; stenosis of the tear passages. Acquired diseases are not likely to be transmitted. There is no hereditary corneal disease. Irideremia is frequently inherited, coloboma of the iris less so, korectopia occasionally. Cataract is not infrequently inherited. Examples of the above are quoted either from his own practice or the reports of others. The following case of color blindness is reported:

I. male, normal, 4 children.

II. a male, color blind, no children.
  b male, normal, 4 children.
  c female, normal, 4 children.
  d female, normal, 6 six children.

III.
Children IIb.
  2 neurotic taint from mother.
  1 female, normal.
  1 (?), (?).
Children IIc.
  3 males, color blind.
  1 female, normal.
Children IId.
  1 male, color blind.
  5 (?), normal.

XXVIII. Hasner. (170)

Mother phthisis bulbi; child, anophthalmus congenitus.

(Example of the inheritance of acquired characteristics.)

XXIX. Helling. (173)

2 brothers and 1 sister amaurotic. Grandparents had same disease.

XXX. Herrlinger. (175)

(10) Patient has retinitis pigmentosa and atrophy of the optic nerves. Grandmother had eye trouble. 1 cousin poor vision.

(11) Patient has retinitis pigmentosa and capsular cataract; several other children had eye trouble.

(12) Patient had retinitis pigmentosa; a maternal aunt had juvenile cataract.

(15) Patient had retinitis pigmentosa; 1 cousin had night blindness and poor vision.

(17) Patient had retinitis pigmentosa and incipient cataract. 1 daughter had eye trouble.

(44) Patient has retinitis pigmentosa; 2 sisters have poor vision.

(51) Patient has retinitis pigmentosa; grandfather, grandmother, uncle and granduncle had chorioiditis with contracted fields of vision.

(66) Patient has retinitis pigmentosa; 1 sister congenitally blind.

(74) Patient has retinitis pigmentosa; mother blind all her life.

(82) Patient has retinitis pigmentosa; maternal cousin has night shadows.

(90) Patient has retinitis pigmentosa; 1 sister blind at age of 5.

(The above, while clearly showing heredity, are not sufficiently explicit for statistical use.)

XXXI. Hess. (176)

"Interesting and distinct is the tendency towards heredity which is found in cataracta zonularis as well as other forms of congenital cataract." "Ectopia lentis shows a decided tendency towards heredity."

XXXII. v. Hippel. (181)

"The inheritance of congenital malformations through several generations is one of the rarest of occurrences. The only one where it is frequent is irideremia. Furthermore, some cases of direct heredity of microphthalmus are very interesting. I know of only two cases of inheritance of anophthalmus. Direct inheritance of cataract is frequent. The direct inheritance of coloboma is infrequent. Albinism, while not frequently inherited in man, belongs to that category through its conduct in animals. Hereditary influences must be thought of when several children are affected with the same malformation, even when there is no direct heredity."

XXXIII. Horner. (191)

- I. male, color blind, 2 children.
- II. a female, normal, 1 child.
  - b female, normal, 1 child.
- III.
  - Children IIa.
    - a male, color blind, 1 child.
  - Children IIb.
    - b male, color blind, 2 children.
- IV.
  - Children IIIa.
    - a female, normal, 2 children.
  - Children IIIb.
    - b female, normal, 1 child.
    - c female, normal, 1 child.
- V.
  - Children IVa.
    - a male, color blind, 2 children.
    - b male, color blind, no children.
  - Children IVb.
    - c male, color blind, 5 children.
  - Children IVc.
    - d female, color blind, no children.
- VI.
  - Children Va.
    - a female, normal, 1 child.
    - b female, normal, 2 children.
  - Children Vc.
    - c female, normal, 4 children.
    - d female, normal, 2 children.
    - e female, normal, 4 children.
    - f female, normal, 4 children.
    - g female, normal, 1 child.
- VII.
  - Children VIa.
    - a male, color blind.
  - Children VIb.
    - b male, color blind.
    - c male, color blind.
  - Children VIc.
    - d male, color blind.
    - e, f, g females, normal.

Children VId.
  h male, color blind.
  i female, normal.
  Children VIe.
  j, k males, color blind.
  l, m females, normal.
Children VIf.
  n male, color blind.
  o, p, q females, normal.
Children VIg
  r female, normal.

I. male, color blind, 5 children.
II. a female, normal, 4 children.
  b female, normal, 5 children.
  c female, normal, 4 children.
  d female, normal, 4 children.
  e female, normal, 9 children.
III.
Children IIa.
  a female, normal, 2 children.
  b, c, d female, normal, no children.
Children IIb.
  e, f males, color blind, no children.
  g, h, i females, normal, no children.
Children IIc.
  j male, color blind, no children.
  k, l, m females, normal, no children.
Children IId.
  n, o, p, q females, normal, no children.
Children IIe.
  r male, color blind, no children.
  s, t, u, v females, normal, no children.
  w female, normal, 4 children.
  x female, normal, 4 children.
IV.
Children IIIa.
  a, b males, color blind.
Children IIIw.
  c, d males, color blind.
  e, f females, normal.
Children IIIx.
  g female, normal.
  h, i, j males, color blind.

XXXIV. Hutchinson. (197)

(A) Patient retinitis pigmentosa and cataract; 2 sisters retino-chorioiditis; their father and his brother and sister blind, cause not stated.

(B) 3 children blind; 1 has defective sight, and 1 can see well.

(C) 6 out of 10 children congenitally blind, cause not stated.

XXXV. Javal. (202)

In his book, Javal, who himself had become blind, describes his attempts to care for himself, and to prevent his becoming a burden to his family and the community. In the chapter on marriage, he says: "It is not a question, be it well understood, of marriage between blind persons, which is contrary to the most ordinary good sense. It is the decision whether a blind man or woman ought to marry.

In the great majority of cases, the marriage of blind persons is not contraindicated by any fears of the blindness being hereditary. Having been consulted in this matter as an oculist, I did not limit myself to my recollections as a practitioner. I went through, before giving my reply, the many biographies of blind persons which are given in Mell's dictionary, and these researches were in accord with my own rememberances, confirming, that if there are cases of hereditary blindness, they are so rare as to have escaped our investigations.

Nevertheless, it does not follow that the physician should give his approval to every blind person who wishes to marry. The vast majority of cases of blindness are to be looked on as accidental. * * * But if the blind person who wishes to marry has lost his sight from an affection of the optic nerve, the chorioid or even the retina, some care should be taken * * * Leaving aside, then, some exceptional cases, the physician ought not to oppose the marriage of the blind. However that may be, before marrying the blind will do well, under pain of lamentable consequences, to have it considered twice by some devoted friend."

XXXVI. Johns. (204)

We try to prevent blind men marrying blind women, but it is exceedingly hard to check.

XXXVII. Jones. (206)

2 brothers with ectopia pupillae. 2 normal.

XXXVIII. Katz. (209)

Relation of married to unmarried blind 5 to 3.

XXXIX. Koenigstein. (222)

Father eye trouble. Father and mother related. 12 abnormal children

XL. Labiche. (228)

3 children amaurotic.

XLI. Laqueur. (235)

Heredity affects patient in the following order: retinitis pigmentosa, congenital cataract, albinism, irideremia, microphthalmus, cataracta juvenilis, coloboma, maculae luteae, ectopia lentis, myopia maxima, buphthalmus, hereditary neuritis optica of puberty. In 48 affected families, containing 244 children, 79=33 1/3% were affected with hereditary eye diseases.

XLII. Lawrence. (241)

Twin girls, exactly alike, became amaurotic at the same age, with the same symptoms.

XLIII. Lefebure. (249)

Male at the age of 6 bilateral amaurosis. Had 6 children, 5 of whom became amaurotic at the age of 6. His sister had incomplete amaurosis complicated by cataract, as did her daughter.

XLIV. Lucas. (256)

Grandmother, 35 years old, amaurotic: grandfather normal eyes. Mother amaurotic at age 17, with slight perception of light. Of her 7 children, 1 became blind at the age of 13, 1 at the age of 11. Another showed the same symptoms, but was cured by a physician. 1 died at the age of 2, without eye involvement. 3 others, ages 13, 3, 1, so far normal.

(This is probably a case of hereditary optic nerve atrophy, but comes from preophthalmic times.)

XLV. McGregor. (258)

3 children out of 5 had glioma retinae. Parents normal.

XLVI. Magers. (272)

2 brothers, in middle life, about the same age had a chorio-retinitis. No cause other than heredity found.

XLVII. Magnus. (273)

(A) Patient microphthalmus duplex cum coloboma iridis et chorioideae. 1 sister congenitally blind, probably same condition.

(B) Patient microphthalmus duplex, cataracta dextra, chorioiditis sinis. 1 sister born blind.

XLVIII. Magnus. (274)

In 770 cases of bilateral blindness, found 41 cases of congenital blindness as follows:

Anophthalmus and microphthalmus, 19, 2.47%.
Megalophthalmus, 2, 0.26%.
Cataracta accret. congen., 2, 0.26%.
Chorioiditis congen., 2, 0.26%.
Atrophia nerv. optic. cong., 3, 0.39%.
Retinitis pigmentosa cong., 11, 1.43%.
Retinal atrophy, 2, 0.26%.

He reports 21 cases where blindness affected one or both parents before marriage. (In most of these the parents had blenorrhea neonatorum. Where the disease was a hereditary one, it will be found reported under its proper head.) There was a total of 49 children, 8 of whom were blind=16%. Out of 41 cases of congenital amaurosis, there were 8 cases of collateral heredity=25%.

XLIX. Magnus. (276)

Found inheritance in 50 out of 551 cases of congenital blindness=9.07%. Of these 50 cases, 34 (68%) were directly inherited and 6 (12%) were indirectly inherited. In 3204 cases of blindness—collected from his own practice and 64 European institutions for the blind—there were 50 cases of inheritance=1.56%. The mother transmitted the disease in 20 cases=40%, the father in 24 cases=48%, and both in 6 cases=12%. Of 1195 females, 23 inherited their blindness=1.92%. Of 2009 males, 27 inherited their blindness=1.34%. In 551 cases of congenital blindness there were 94 cases of collateral heredity = 17%.

L. Manz. (278)

Malformations of the eyes are frequently the result of heredity.

LI. Monteath. (294)

Woman, age 83, completely blind; 1 sister, age 81, amaurotic; 1 daughter, age 56, amaurotic. Son and grandson both weak eyes. A grandson has congenital amblyopia, every exertion causing transitory blindness.

LII. Neuffer. (315)

(9) Marie A., chorio-retinitis; Elizabeth A., nystagmus and glaucoma; Anton A., retinitis pigmentosa; atrophia nervi optici, nystagmus; Magdalena A., glaucoma; 1 brother normal sight.

LIII. Nolte. (319)

Mother hemeralopia; 1 son atrophy optic nerve; 1 son retrobulbar neuritis; 1 son poor vision, cause unknown.

LIV. Paly. (329)

Gives result of census of the blind in Switzerland, taken in 1895 and 1896. There were 2107 blind persons, or 7.22 per 10,000. Of these, 1783 were examined by physicians. Of this number, 13% had one or both parents blind, or with poor vision; 17% had 1 or more blind brothers or sisters. 886 were married, and 13 others had children born out of wedlock=899. Of this number, 130 had no children; 633, only children with normal eyes; 19, only children with diseased eyes; 45, normal and diseased children; 72, unknown. 6.87% of all blind patients were so congenitally.

1 patient with microphthalmus had a brother with nystagmus and 1 with retinitis pigmentosa.

(The other cases are given under the special heads.)

LV. Perlia. (336)

Mother during pregnancy had an ophthalmia resulting in corneal opacities. Daughter had coloboma of the iris and chorioid, right eye, and anophthalmus, left eye.

LVI. Pflüger. (342)

Brother and 2 sisters color blind.

LVII. Picqué. (343)

Claims that heredity exists in cataract, ectopia lentis, microphthalmus, albinism, retinitis pigmentosa, optic neuritis, aniridia.

LVIII. Purtscher (352)

Mother bilateral coloboma of the chorioid; son microphthalmus.

LIX. Raehlmann. (356)

2 brothers color blind.

LX. Rampoldi. (361)

Grandmother paralysis agitans; 1 daughter blind, age 70; 2 of her sons atrophy of the optic nerve; another daughter bilateral cataract, age 70, became blind later on; her daughter had glaucoma.

LXI. Richter. (369)

Soldier lost left eye by suppuration 15 years before marriage; both his sons had microphthalmus sinister.

(Is this a coincidence or direct heredity?)

LXII. Ridley. (370)

Mother partial iris coloboma and cataract both eyes; child congenital anophthalmus.

LXIII. Robertson. (371)

Father traumatic blindness; mother blind; son microphthalmus.

LXIV. Roth. (377)

"People say you can do nothing for congenital blindness, but we know that this congenital blindness is caused in many cases by the intermarriage of blind persons."

LXV. Sanson. (382)

Father, 2 daughters and 2 sons became amaurotic at age of 21.

(Probably optic nerve atrophy; comes from preophthalmic times.)

LXVI. Schmidt. (394)

Father atrophy optic nerve (?); 1 son malformation optic nerve; 2 younger sons retinitis pigmentosa.

LXVII. Schoeler. (400)

I. female, normal, 5 children.
II. a male, color blind, 10 children.
b male, color blind, 3 children.
c male, color blind, 6 children.
d, e male, color blind, no children.
III.
Children IIa.
10 (?), normal.
Children IIb.
1 female, color blind.
2 males, normal.
Children IIc.
4 males, color blind.
2 females, normal.

LXVIII. Schwarz. (402)

Ectopia pupillae in 3 children.

LXIX. Sedgwick. (405)

4 out of 10 children and paternal uncle became blind at ages 42 to 60.

LXX. Silcox. (410)

Granddaughter melanosarcoma 1 eye; mother same; 1 aunt lost eye and died of multiple sarcomata; 2 other aunts and grandfather also lost eye from sarcoma.

LXXI. Stilling. (429)

Frequently found several brothers affected with color blindness; also, grandfather and 2 grandchildren color blind, father normal.

LXXII. Story. (433)

4 brothers and 1 sister in family of 8 suffered with central scotoma; strong neurotic taint in family.

LXXIII. Travers. (455)

3 members of a family had dark hair and eyes; others were blond; at puberty, the brunette became epileptic and gradually lost their sight; the others retained theirs.

LXXIV. Varese. (459)

Mother and son affected by a peculiar retraction of the bulb when left eye looked to the right.

LXXV. Vossius. (467)

"We consider a disease inherited when we find it existing, without any other cause, in a patient whose parents, other relatives or ancestors were affected by the same or a similar disease. * * * Glaucoma, cataract, strabismus, color blindness, night blindness, myopia, astigmatism and malformations of the eye, such as microphthalmus and coloboma, are inherited. The affection is usually transmitted through the mother, although she herself may have normal eyes. The disease may skip a generation, to reappear in the next. When there is consanguinity of the parents in addition to the hereditary taint, the disease usually attains a very high degree."

LXXVI. Weiss and Ottinger. (472)

(A) Boy, age 4, coloboma iridis sin; mother at age 10 injury to left iris and lens; 2 normal brothers; 1 squints.

(B) Boy, age 7, coloboma iridis et chorioideae; 1 brother anophthalmus left eye and coloboma iridis right eye; mother hemeralopia during pregnancy; 4 brothers normal.

(C) Girl, 20 weeks old, coloboma iridis et chorioideae dext.; microphthalmus sin. Mother hemeralopia during pregnancy.

LXXVII. Weyert. (477)

I. male, coloboma nervi optici, 5 children.

II. a female, coloboma nervi optici, 2 children.
  b female, coloboma nervi optici, 2 children.
  c male, coloboma nervi optici, no children.
  d male, normal, 3 children.
  e male, normal, no children.

III.
Children IIa.
  a female, coloboma nervi optici, 13 children.
  b female, coloboma nervi optici, no children.
Children IIb.
  c male, coloboma iridis.
  d, e females, normal.
Children IId.
  3, (?), normal.

IV.
Children IIIa.
  13, (?), normal.

LXXIX. Wicherkiewicz: (478)

3 children persistent pupillary membrane.

LXXX. Wolff. (485)

3 children with retraction movements of left eye and congenital defects external muscles.

LXXXI. Zehender. (492)

1 out of every 1193 persons blind. Congenitally blind more capable of work than acquired blind.

LXXXII. Zepler. (493)

The pathologic condition of either parent may affect the offspring through its sexual element, and cause greater or less pathologic changes and malformation in the offspring. If both parents are affected in the same way, the action is cumulative and the chances of the offspring escaping is much less. If the parents are related, i. e., come from the same stock, the action is also cumulative. Although one or both parents may be apparently free, their children may be pathologically affected, the result not being so much due to the relationship of the parents, *per se*, as to the fact that it allows the pathologic cause to have a sufficiently cumulative action to produce the disease.

On ground of 545 cases reported by Magnus, he draws the following conclusions:

(1) Marriage of blood relations from absolutely healthy families is free from dangers to the children.

(2) The pathologic conditions caused by marriage of blood relations can be explained by the so-called potential or cumulative inheritance, to which are added many accidental circumstances which strengthen it

(3) Outside of consanguinity, collateral inheritance is found in a large number of cases, but this can be absolutely confirmed only after collecting a large number of statistics of marriages.

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ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

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Galvanocautery Puncture in Ectropion and Entropion.

ZIEGLER, LEWIS, Philadelphia (*Jr. A. M. A.*, July 17, 1909), presents a simple procedure which he has used for many years with very satisfactory results. Two instruments are required, one, a short galvanocautery point, the other, a lid clamp. The galvanocautery point should be short, thick and sharpened so as to puncture readily. The lid clamp is a modification of his chalazion clamp, which has a straight edge that is a perfect guide for the row of punctures. It is made with a sliding catch; renders an operation bloodless, and benumbs the tissues to a certain extent. As an anaesthetic he uses a 4 per cent. solution of cocaine on the conjunctival surface, but in nervous, sensitive patients a deeper anaesthesia is necessary.

For the operation the lid clamp is adjusted with its straight bar 6 mm. from the lid margin. The galvanocautery point is applied to the surface with considerable pressure, the current turned on and the point quickly pushed through the cartilage and as quickly withdrawn. The punctures are made 4 mm. from the lid margin, and 4 mm. apart.

The writer claims that this procedure possesses the double advantage of vertically contracting the relaxed lid, and at the same time shrinking and shortening the length of the lid, and reports several successful cases. O. W.

Another Case of Meningococcus Conjunctivitis.

McKee, S. Hanford, Montreal (*Ophthalmic Record*, June, 1909), reports the case of a girl thirteen years old, who, two days previous to examination, had an unusually severe headache and was unconscious when brought to the hospital. She had a definite catarrhal conjunctivitis more marked on the left side than on the right.

Media of blood serum and haemoglobin agar were inoculated with secretion from each conjunctival sac, and examined 24 hours later. From the right eye the bacillus xerosis and a Gram negative diplococcus were found; from the left, the bacillus xerosis, the staphylococcus albus and a Gram negative diplococcus. This Gram negative diplococcus from the conjunctiva was identical with the meningococcus which was cultivated from the cerebrospinal fluid, upon two occasions. O. W.

Staphylococcus Vaccination in Phlyctenular Disease.

Gradle, H. (*Ophthalmic Record*, June, 1909), claims that phlyctenular disease occurs only in scrofulous subjects, while there is no clinical reason for believing that the phlyctenule, itself, is a tubercular lesion. It occurred to him that the persistence of phlyctenular lesions might be sometimes due to a secondary staphylococcus infection, and that this might be combated by vaccination according to Wright. He has tried this vaccination in nine cases selected from private practice, and while there was no sudden change in any case, in every instance the improvement, uncertain after the first vaccination, continued regularly after the second or third. This treatment does not attack the first cause of phlyctenular disease, therefore it does not prevent relapses, but those cases which had a recurrence yielded more promptly than at first, on account of the previous staphylococcus vaccination. O. W.

Trachoma Bodies Possibly the Etiologic Factor of Trachoma.

Pusey, Brown, Chicago (*Jr. A. M. A.*, July 3, 1909), calls attention to the fact that in April, 1907, Halberstädter and Prowazek described some bodies which they had found in epithelial cells taken from trachomatous conjunctivae, and which they maintained were the etiologic factor of trachoma. He says that he has recently had in his care a case of distinct clinical acute trachoma in which he found similar bodies. The article is illustrated, the smears from which the drawings were made prepared by scraping the everted conjunctiva with the edge of a cover-glass; the scrapings were spread over the glass and allowed to dry in the air; the material was then fixed for twenty minutes in methyl alcohol; then stained for twenty-four hours with Giemsa's stain. The first figure shows the beginning of the growth of the bodies in the cell as described by Prowazek; the second and third show their later development. O. W.

Epibulbar Leucosarcoma.

Wood, Casey A., Chicago (*Journal of the A. M. A.*, July 24, 1909), reports a case of epibulbar leucosarcoma met with in a girl 15 years old. The orbit was exenterated. No recurrence appeared in the orbit, but the patient died three months later, possibly from a metastasis in the abdomen. No autopsy was allowed. M. L. F.

Symblepharon and False Pterygium from Fireworks Burn and Successful Operation.

Hawley saw the child in consultation with Campbell and it was decided to transplant a piece of skin on the sclera at the edge of the cornea. The advantage of the skin graft over the ing from burns about face and eyes on July 4, 1906. When first seen by Campbell the eyes were filled with powder ashes and the right eye was burned so that the cornea was denuded of its epithelial layer, and the eyeball burned to the outer canthus. After healing, a band of cicatricial tissue extended from the outer canthus to nearly the centre of the cornea, seriously limiting the inward movements of the eyeball. The symblepharon extended to the upper and lower lids toward their outward border.

At this time five minor operations were performed, dissecting off the false pterygium and cicatricial tissue, inserting metal plates, etc., with no results.

Hawley saw child in consultation with Campbell and it was decided to transplant a piece of skin on the sclera at the edge of the cornea. The advantage of the skin graft over the mucous graft, Hawley claims to be due to the fact that a mucous graft grows over the denuded cornea before the cornea has had time to regenerate; while a skin graft forms a bridge over which the pterygium cannot creep and this gives the cornea time to regenerate. The skin graft used should be very thin.

This method was followed and for six weeks the results seemed perfect, when it was noticed that the skin from the outer canthus was beginning to form over the graft and was soon over the denuded cornea the same as before.

The authors decided that the failure of the operation was due to not making the graft of a tissue distinct from the tumor and over which the tumor could not grow. Hence they placed a mucous bridge on the sclera by dissecting back the scar tissue from the cornea and removing it, then the conjunctiva was undermined above and below and the edges brought together and sewed. Thus the skin tumor was removed. Later, when the eye was quiet the mucous tissue left on the cornea was removed, as in the first operation, and replaced by a skin graft, the graft being very thin and fixed above and below by sutures. The result was perfect.

G. H. W.

Rodent Ulcer of the Cornea (Mooren's Ulcer).

Randolph, Robert L., Baltimore (*Journal of the American Medical Association,* July 24, 1909), reports a case of rodent ulcer of the cornea, met with in a man 52 years of age, in which no substantial or permanent advantage was gained by the use of the galvanocautery. At the time of writing the cornea was gray all over and the writer says that he has almost made up his mind that the patient has done better since all aggressive treatment has been abandoned.

M. L. F.

Report of a Case of Keratitis Probably Due to Metastatic Gonorrhea.

POSEY, WM. CAMPBELL, Philadelphia (*Ophthalmic Record*, May, 1909), reports a case seen by him in December last, in which an inflammation of the right eye had lasted three days. The eye had been inflamed twelve years before, consequently, its vision was not equal to that of the other eye which had always been healthy. The patient was in good health, but thinking that the ocular inflammation was connected with attacks of urethritis from which he had suffered, a smear was taken from the cornea of the inflamed eye, and gonococci were found present there, as well as in the secretion from the urethra. The patient was admitted to the hospital, and was treated locally by heat, atropine, iodoform, and later by dionin, and generally by injections of antigonococcic serum into the buttock, in doses of 1/2 to 1 cc. of Mulford's preparation. The injections of serum did not seem to have any favorable influence on the inflammation of the eye. This treatment was continued for over a month, but no abscesses at the point of injection resulted. After two months' stay in the hospital he was discharged with the eye quiescent, and vision reduced to counting fingers, consequent upon a dense superficial opacity of the cornea, the result of the scars produced by the original attacks of inflammation and by the ulceration from the breaking down of the vesicles. O. W.

Keratitis Punctata Superficialis, with Report of a Case.

WEINER, M., St. Louis (*Archives of Ophthalmology*, March, 1909), reports the case of a young woman twenty-one years of age, who had been complaining of a sense of irritation in the right eye and of constant lacrimation. She had been refracted seven months before. Vision in the right eye had fallen from 14/12 to 14/15, and there was a slight injection of the right conjunctiva. With oblique illumination the cornea was seen to be studded with numerous small round grayish dots, about thirty in number, averaging about 1 mm. or less in diameter and raised above the surface of the cornea. The spots were located in the center of the cornea in the superficial layers. The fundus was normal. Treatment with an antiseptic solution and an aseptic powder with cold compresses resulted in complete recovery; visual acuteness 14/12.

H. G. G.

The Prophylaxis of Interstitial Keratitis.

GIFFORD, H., Nebraska, (*Jr. A. M. A.*, July 3, 1909), believes that the problem of the prophylaxis of interstitial keratitis resolves itself into the prevention and cure of syphilis, especially of the hereditary form. He emphasizes certain peculiarities of the teeth as aids in diagnosis; and believes that if all children between three and sixteen years of age could be examined for the more obvious signs of inherited syphilis, and those showing such signs could be subjected to a course of specific treatment, the number of cases of interstitial keratitis and of syphilitic deafness could be greatly reduced.

For three years he has treated interstitial keratitis with the same course of inunctions as in ordinary syphilitic iritis. Through the active course of the disease, atropin and hot applications are used, and salicylate of sodium is given to control the symptoms of congestion and photophobia.

O. W.

The Formation of Pupillary Membranes after Cataract Extraction.

THOMSON, EDGAR L. (*Archives of Ophthalmology*, May, 1909), describes the composition of the different forms of secondary cataract. and goes on to say that in the most favorable cases, when the cortex is largely removed at the time of operation, we have a membrane formed of transparent posterior capsule, with a circular rim of cortical fibres at the lens equator. This rim is composed of lens fibres, which are enclosed by the apposition of the remains of the anterior capsule and the posterior capsule, and are therefore protected from the solvent action of the aqueous. They are not absorbed, and indeed invariably increase in volume by proliferation, and in some instances infiltration with leucocytes and fibroblasts. The contraction of these membranes, after connective tissue invasion, is probably responsible for the apparently spontaneous attack of uveal irritation which we sometimes see after cataract extraction. The connective tissue changes, he believes, come from the iris fibroblasts and he cautions us to limit the amount of hyperaemia as much as possible by the judicious use of ice, atropine, etc., in the early stages.

H. G. G.

A Cystic Formation by the Pars Ciliaris Retinae Following a Perforating Wound in the Ciliary Region.

Chance, Burton, with Histological findings by Goldberg, Harold, G. (*Archives of Ophthalmology,* March, 1909), reports the case of a locomotive engineer who had, the morning of the day he was seen, been struck in the eye by a piece of flying glass. An examination revealed a perforating wound in the ciliary region with uveal tissue bulging into the lower angle. Twelve days later, the wound refusing to heal, an enucleation was performed. On dissection of the globe no particles of glass were found. A microscopic examination revealed a cyst formed by the pars ciliaris retinae and covered by a substance taken to be modified vitreous. The cyst was supposed to have been formed by a hemorrhage on the internal surface of the ciliary body beneath the pars retinae, which, tearing up this membrane and causing it to bulge forward by the collection of fluids beneath it, was caught in the force of the intraocular fluids and carried through the wound, where it formed a cyst. Especial attention was called to the early presence of epithelioid and giant cells in the ciliary region and the very rapid destruction of the retina and chorioid. H. G. G.

Operative Treatment of Separation of the Retina. Reports of Cases Treated by Scleral Puncture.

Ellis, Edward Keith (*Archives of Ophthalmology,* May, 1909), after rehearsing the different operative procedures suggested and practiced for the relief of this condition, states that the most successful method in his hands is the simple method of puncture of the sclera and retina, evacuating the subretinal fluid together with some vitreous, placing the patient flat in bed with both eyes bandaged for a period of at least ten days, and if deemed advisable employing daily subconjunctival injections of salt solution. The solution may be started at 6% and increased up to 20 or 25%. He reports two cases in which the above procedure was practiced with good results. He concludes by saying that he believes the advice of Deutschmann, to repeat the process as often as necessary, can hardly be emphasized too strongly.

H. G. G.

Neuro-retinitis Due to Typhoid Fever.

Clothier, Jos. V., Philadelphia (*New York Medical Journal,* April 10, 1909), reports a case of neuro-retinitis due to typhoid fever, in a patient 16 years of age. In October he had been fitted with glasses and the fundus of both eyes found normal.

The patient was taken ill with typhoid fever on December 24th. The blood gave typical Widal reaction and the fever followed its usual course until January 6th, when the patient complained of photophobia. On January 7th, he was unable to recognize people; could distinguish the form, but not the face or the color of the individual and complained that everything was black.

Ophthalmoscopical examination showed bi-lateral neuro-retinitis; the papillae swollen, their outlines obscured, the vessels partly concealed, and the veins full and tortuous. The macular region in each eye was cloudy, with some faint radiating striae toward the disk. As the temperature gradually declined there was a corresponding subsidence of the papillitis and improvement of vision. The present vision with the old correction is O. D. 5/12; O. S. 5/9. The swelling of the disks has subsided, their temporal and nasal margins are well defined, the superior and inferior borders still cloudy. The macular region still has some faint radiating striae. The vessels are normal. G. H. W.

Dropsy of the Optic Nerve Sheath.

Tenney, John A., Boston (*Jr. A. M. A.,* July 3, 1909), reports three cases of optic neuritis, two of which were completely cured by the use of potassium iodid in saturated solution. The first case was that of a young woman in whom the vision of the right eye was 3/60 while with the left she could only see the windows in a room. She vomited every day, often fell down in the street, and had bad headaches. The potassium iodid treatment was commenced with ten drops three times a day, increased by five drops a day. When she was taking fifty drops the characteristic eruption appeared and was relieved by arsenic. The potassium iodid was then reduced to twenty drops at a dose. In six months she was able to see 20/20 with each eye. The second case was that of a school girl, aged 15, who had lost the vision of the right eye. Under moderate doses of potassium iodid the sight was completely restored within a week. The third case was that of a young girl who had lost the sight of her right eye for about six weeks. She was given the iodid; and returned home within ten days. A year later when she again applied for treatment, her vision was worse than at first. The dose was increased; she left for home within ten days, and has not been heard from since. The writer has seen eight similar cases; he has never used pilocarpin, believing that the iodid, with its alterative action, will prevent the return of the disease. O. W.

Tenotomy or Advancement.

Howe, Lucien, Buffalo, N. Y. (*Jr. A. M. A.*, July 17, 1909), remarks that in order to decide between a tenotomy and an advancement in a given case we must first know whether the deviation is due to insufficient action of one group of muscles, or to the excessive action of another group, or to both causes acting at once. To do this it is necessary to obtain all possible evidence from the refraction, with the condition of the ciliary muscles; the extent of the arc of rotation and the behavior of the eye in rotation, as shown by the perimeter, or tropometer, or both; the exact character of the arc of rotation as shown by photographic tracings; and the lifting power of the adductors and abductors as shown by the ophthalmodynamometer.

O. W.

An Original and Absolutely Reliable Suture for Tucking or Shortening an Ocular Muscle.

Suffa, S. A., Boston, Mass. (*Archives of Ophthalmology*, May, 1909), believes that irregularities are best corrected by strengthening the weak muscle without disturbing its tendinous attachment. If a tenotomy of the opposing muscle is necessary, it should be limited to the smallest degree. This operation may be described as follows: After the muscle has been exposed a tenotomy hook is passed beneath the muscle close to its attachment to the globe. A specially bent hook, called the retraction hook, is passed under the muscle and the conjunctival flap is pushed and held back while the muscle is slightly raised. This hook remains in place and by its own weight exposes the muscle. The tenotomy hook is removed and replaced by the myometer fitted with an adjusted graduated scale set at the number of millimeters that the muscle is to be shortened. The stitch is placed as follows: The center of a No. 6 silk suture, with a curved needle at each end is laid across the muscle between the hook and the muscle clamp. The upper needle is passed beneath the upper border of the muscle, through the muscle close to the clamp, between it and the cross thread, including one-fourth of the width of the muscle, and the thread is pulled through to the center of the suture. The needle is then passed over the cross thread and through the muscle from above inward in the same relative position, and the suture is drawn out forming a loop. The needle and thread are then passed underneath the muscle clamp, under the tenotomy hook and through the tendon, close to the sclera, still in the same relative position. The lower end of the suture is placed in the same manner. The needle is passed from beneath outward, close to the muscle clamp, between the clamp and the cross thread, and the suture drawn sufficiently taut to take up all the slack in the cross thread. Then the needle is passed over the cross thread, down through the muscle from without inward, drawing the suture taut and forming loop No. 2. Then under the muscle clamp and tenotomy hook and through the tendon at the lower border of the muscle in the same relative position, one-fourth the width of the muscle. The sutures are cut to tie while the tenotomy hook is being raised by an assistant, thus forming the tuck in the muscle . H. G. G.

The Management of Acute Hemorrhagic Glaucoma in the Presence of Advanced Arteriosclerosis.

Bull, Charles Stedman, New York (*Journal of the American Medical Association*, July 24, 1909), gives the following definition of hemorrhagic glaucoma: "This disease presents the usual symptom-complex of acute glaucoma, occurring suddenly in an eye in which retinal or other intraocular hemorrhages have previously occurred before any glaucomatous symptoms were present, and in which the hemorrhages are the exciting cause. This condition should be differentiated from a pre-existing glaucoma in which hemorrhages have occurred subsequently. Clinically an operation might be indicated in the latter class of cases, but would not only be valueless, but positively injurious in the former class."

"The immediate treatment for the relief of the urgent symptoms is the same for all these cases, but the subsequent management must vary with the age and general condition of the patient and his environment.

"The immediate local treatment which I employ in these cases of hemorrhagic glaucoma, in order to avoid the dangers of an iridectomy is as follows: Under the influence of a 10 per cent. solution of cocain, instilled as often as may be necessary, a careful paracentesis of the cornea is done, the instrument being withdrawn very slowly, and thus the aqueous humor is allowed to flow out only drop by drop from the anterior chamber. In this manner the intraocular tension is lowered very slowly, and the danger of the occurrence of an intraocular hemorrhage is reduced to a minimum. Two or three leeches are then applied to the temple and allowed to fill themselves until they drop, or the Heurteloup wet cup may be used, and the bleeding kept up as long as may be necessary. Then a solution of eserin sulphate, one grain, and pilocarpin hydrochlorate, four grains to the ounce is instilled every hour, until under the combined influence of the paracentesis, the local bleeding, and the miotics, the eye softens and the pain grows less. As the intraocular tension subsides and the intravascular tension diminishes the pain grows less and the instillation of the miotics may be less frequent. Then the patient is directed to have hot applications made to the eye for half an hour at a time, and to repeat them every two hours until the pain has gone. He is also directed to take twenty drops of the fluid extract of Jaborandi three times a day, as a valuable additional means for lowering the intravascular tension. Hypodermic injections of pilocarpin will bring about the same result, but in the presence of advanced cardiac disease they are dangerous. It is sometimes necessary to repeat the paracentesis of the cornea several times in the same careful way at varying intervals, but eventually the end is accomplished.

"As the symptoms subside the use of the miotics may be reduced to two or three times a day, and then the all-important subsequent management of the patient begins. This must vary with the age and general conditions of the patient and the severity of the type of lesion. The habits of life must be regulated, being modified in strictness by the patient's general condition and environment. It must be largely dietetic, based on accurate knowledge of the patient's digestive capabilities. The administration of drugs, except to combat certain symptoms as they arise, is of secondary importance. The daily life of the patient should be rendered as quiet as possible, and there should be great moderation in eating and drinking. As an abundant meat diet raises the blood pressure, the amount of meat eaten should be strictly limited. For some of the patients a certain definite amount of systematic exercise, preferably walking in the open air, should be insisted on, because it increases oxidation, improves the capillary circulation and aids in the process of elimination. If the patient has been addicted to the use of alcohol in moderation, it is not wise to interdict it, but it should be taken largely diluted, for while dilating the peripheral blood vessels, it does not increase the blood pressure to any appreciable extent. Tobacco should be forbidden or only slightly indulged in, because it contracts the blood vessels and raises the blood pressure. Water should be drunk freely between meals in order to aid elimination. The products of faulty metabolism which induce hypertension only exercise their toxic effects while in the circulation. The uric acid group are largely eliminated through the kidneys, and the best renal eliminants are the salts of soda, potash and lithia. Each patient should be carefully studied for himself, and the dietetic and therapeutic management varied according to the necessities of the case In many of these patients the arteriosclerosis has forced the heart to do an excessive amount of work, and at the slightest additional burden the heart may collapse in spite of the administration of a cardiac stimulant. If the general symptoms are severe the first necessity is rest in bed, and this must be enforced if we are to expect any improvement. Muscular exercise often produces temporarily a rise in vascular tension, and complete muscular rest in bed removes the additional strain and gives the heart a chance to recover its tone. I believe that in many, if not in all, these chronic cases in high-strung nervous individuals, the cardiovascular sedatives ordinarily employed are almost useless unless rest of the body in bed is insisted on.

"To reduce the high blood pressure I employ sodium nitrite as a vasodilator, but always in combination with some reliable heart tonic. It is a wise precaution to have a thorough examination made of the heart and general circulation before prescribing any cardiac drugs, especially the vasodilator drugs. A rapid, irregular or intermittent pulse, with a rapid pulse rhythm and with a systolic murmur, probably indicate a cardiac inadequacy with high blood pressure, and in such a condition cardiac stimulants should be combined with vasodilator drugs. A high blood pressure does not necessarily mean the need of prompt administration of drugs, for Nature often maintains a cardiac integrity, in spite of the circulatory resistance, and the apparently urgent symptoms yield gradually without the use of drugs to reduce the pressure. If the blood pressure be over 200 millimeters of mercury, the vasodilator should be slowly administered and its effect on the blood pressure, the pulse rate, and the sensations of the patient carefully noted. The subjective sensations of the patient are often a better means of judging of the effect produced than the blood pressure or the pulse rate. The administration of a full dose at once might cause very serious consequences to the patient's heart.

"I have tried the systematic employment of hot baths, as recommended by Hirschfield, but with indifferent success. The hot bath changes the distribution of the blood pressure by unloading the internal organs and increasing the vascularity of the skin, and should afford prompt relief from pain. It also increases the elimination of waste products. But we must note very carefully the reaction of the patient, and it is not safe to begin with a temperature of more than 100 degrees. The duration of the bath should not be over ten minutes. Of course, the deciding factor in the application of the hot bath should be the condition of the heart and the quality and distinctness of the first and second aortic sounds. Without a fairly vigorous heart the hot bath must be very cautiously employed.

"Following the suggestions of Erlenmeyer and Fraenkel, I always give the patients some preparation containing iodin to reduce the viscosity of the blood. Either potassium iodid or sodium iodid, by diminishing the frictional resistance of the blood current, causes a diminution of the obstruction to the circulation and brings about better nutritive conditions in the parts. I give the potassium iodid in progressively increasing doses, changing to sodium iodid when the stomach revolts, and continue the use of the one or the other drug for a period of weeks or even months. When the administration of these drugs must be suspended for a period I advise the patient to take in the interval two or three drops of a 1 per cent. solution of nitroglycerine." M. L. F.

Herpes Zoster Frontalis Associated with Glaucoma.

Bradburne, A. A., Southport, England (*Ophthalmic Record*, April, 1909). The interesting feature of this case was that while there was increase of intraocular pressure, the pupil was *not dilated*. To a superficial examination, the case presented a typical picture of iritis; and only a careful scrutiny prevented the instillation of a mydriatic which would have had a most unfortunate result. This proves the necessity for observing minutely every detail in eye affections. Dr. Weldon C. Carter, who had seen the case first, noted the absence of the rose-red ring of ciliary injection around the corneoscleral margin, that the cornea was bright and clear, the iris markings not obscured, and the pupil fairly mobile, a combination of contradictory signs which led him to seek the opinion of the writer. The suggestion of acute glaucoma, by the intensity of the pain, was negatived by the clearness of the cornea, the absence of the dusky venous engorgement of the ocular conjunctiva, and the absence of extreme hardness of the eyeball. During the course of the disease the condition of the eye changed and showed symptoms which indicated the urgent necessity of preventing adhesions between the iris and the lens capsule, and the use of a mydriatic was as necessary as it had been previously contraindicated. Recovery was rapid. This case proves that it is possible for classical symptoms, at times, to become misleading.

O. W.

Scissors-Magnet Extraction of Iron from Eyeballs.

Jackson, Edward, Denver (*Jr. A. M. A.*, June 19, 1909), proves by reference to literature that the electro-magnet often fails to extract pieces of iron capable of magnetic attraction, because they are too firmly imbedded in recent exudate or organized tissue. To overcome this difficulty, he uses scissors held in contact with the magnet while they are employed to free the foreign body; and reports two cases in which this method was successful.

In the first case the fragment of steel had been in the eye for over five months, both the giant and large hand magnet having failed to remove it. After a meridional incision had been made in the sclera the knife came into doubtful contact with the foreign body, and an attempt was made to cut both above and below it, with a rather free incision in front of it. The tip of the Johnson magnet introduced twice nearly in contact with the fragment, pulled the eyeball out of shape. An unsuccessful attempt was made to seize it with forceps. A scissors with blunt points was introduced as near to the foreign body as possible, the round end of the core of the magnet was then placed in contact with the point of the scissors, the current was turned on, and five or six snips were made with the scissors which was then withdrawn still in contact with the magnet, and the foreign body was found adhering to the blades. The eye was closed without suture.

In the second case the fragment of steel had been in the eye for three years, and was successfully removed by an operation similar to that described above, useful vision being preserved.

In conclusion the writer remarks that the scissors used were curved on the flat, and had fine. slightly blunted points.

O. W.

A Case of Intervascular Endothelioma of the Orbit.

Watanabe, B., Tokio, Japan (*Archives of Ophthalmology*, March, 1909), reports the case of a six months old child who had had since birth a bluish swelling on the right upper lid, which had increased in size for some months and became more marked on pressure and on crying. Gentle pressure gave the sensation of fluctuation, and by firmer palpation a convolution of vascular loops could be felt in the orbit. The child was apparently healthy and an investigation of the fundus of the eye was negative. The eyeball was pressed somewhat inward and downward by the tumor, but there was no real restriction of its mobility. The tumor was exposed by an incision made in the brow and was found to lie in the upper, outer part of the orbit, and to become smaller as it went deeper. It was removed between two double ligatures almost in toto. Healing took place by primary union. Nearly a year later the child was again returned to the clinic, when the mother stated that the eye had again protruded for some months. A soft tumor could be felt in the upper, outer part of the orbit, evidently a recurrence. Kroenlein's operation was performed and the growth was extirpated as thoroughly as possible with protection of the eye muscles and the optic nerve. Primary union followed and the child was discharged. Nearly a year and a half after the second operation the child was brought back by request, when it was found that the right eye was perfectly normal and the cosmetic effect of the operation very satisfactory. A microscopic examination of the tumor revealed a typical picture of cavernous angioma with the exception that the vessels, which were filled with red blood corpuscles and lined with a single delicate layer of endothelium, were not separated by a scanty stroma of connective tissue, but by cells of endothelial character closely packed together. The growth was examined in three parts; in the second, the histology differed from that just described by the gradual disappearance of the vascular spaces, leaving a field of endothelial cells which the writer believes might have been mistaken for a round cell sarcoma. In the third portion, the lacrimal gland was included, the bands of endothelial cells adhering closely to the penetrating vessels in their course through the substance of the gland. It is noteworthy that in spite of the former recurrence, the diffuse character of the neoplasm, and the surely not radical extirpation at the second operation, a second recurrence has not taken place at the end of a year and a half. Operative removal of such tumors should not be delayed; other methods of treatment present little hope of success. H. G. G.

Simple Fibroma of the Orbit.

Gamble, William E., Chicago (*Jr. A. M. A.*, July 3, 1909), calls attention to the fact that a most careful study of the microscopic section is necessary to differentiate between endothelioma and fibroma; and reports the case of a man, aged 55, from whose orbit a white, hard, encapsulated tumor was enucleated. Microscopic examination showed it to be a pure fibroma, homogeneous throughout. It had but few bloodvessels, and conformed in every way to Parson's test. Within four years there has been no recurrence of the deformity; the eye has assumed its normal position and the cosmetic effect is good. O. W.

Foreign Body of the Orbit of Long Standing.

Clothier, Joseph V. (*Journal of Ophthalmology and Oto-Laryngology*, March, 1909), reports the case of a man aged 23, who 16 years previously exploded a railroad torpedo with a hammer. After the explosion a wound behind the upper, inner angle of the orbit was dressed by a physician and healed without complications. After that the patient had occasional attacks of dull pain over the seat of injury and in the supraorbital region. These attacks increased in frequency and severity and finally a red spot appeared over the middle of the old scar, grew darker, and two days before the patient was seen by Clothier, a small opening appeared, from which issued a thin watery discharge. Through this a rough movable body could be felt with a probe. An incision was made and an irregular piece of copper 10 mm. by 5 mm. was removed from midway between the eyeball and the wall of the orbit. There has been no pain since.

The usually rapid reaction from foreign bodies of copper makes this case of special interest. G. H. W.

Report of a Case of Unilateral Retrobulbar Neuritis Due to Ethmoiditis with Restoration of Vision.

Krauss, Frederick, Philadelphia (*Ophthalmic Record,* May, 1909), remarks that the accessory sinuses of the nose are claiming increased attention from the ophthalmologist, and that they are a frequent cause of ocular disease. One of the most significant ocular symptoms of chronic sinus disease is central amblyopia, varying from the subjective sign of a black spot before the eye, to an absolute scotoma, the result of disease of the macular fibres of the optic nerve. The rapidity with which the retrobulbar neuritis disappears after the evacuation of the pus from the opened sinuses would indicate that retrobulbar neuritis is due to a local toxaemia. Another reason for supposing that a toxaemia is present in these cases is the fact that the inflammation especially attacks the macular fibres.

The case reported by the writer is that of a married woman, aged 25, who was first seen on June 5, 1909, when she complained that for two days she had suffered with severe pain in the right eye accompanied with very dim sight and a constant black spot. This eye had always been divergent, but the sight was good. She had been using glasses for two years, and was wearing for each eye + .75 D. sph. ⌢ + 3 D. cyl., with which her vision was in O. D. 2/30 dimly and 5/7½ in O. S. The next day there was marked tenderness on pressure of the upper inner orbital wall where there was a slight swelling. Pain was constant and the right globe was sensitive to pressure; the black spot was more intense. Examination of the nose showed that the septum was deviated to the right and crowded against the middle turbinate bone. Cocaine and adrenalin were applied freely to the middle turbinate after which there was a watery discharge from that side of the nose. After treatment of the eye and nose for several days the septum was straightened, a large part of the middle turbinate bone removed, and the affected anterior and posterior cells cleansed. The healing was uneventful, the result being a straight septum in the median line. Five days after the operation the pain had disappeared as had also the tenderness and swelling on the inner and upper wall of the orbit. Ten days later her vision was 5/10, normal field, no scotoma. One month after the operation her vision was 5/6, the black spot had disappeared; and in February, 1909, she had normal vision, 5/5 in both eyes. O. W.

The Ocular Complications of Nasal Sinus Disease.

Knapp, Arnold (*American Journal of The Medical Sciences,* July, 1909), says that the most common ocular complication due to nasal sinus disease, is the mechanical displacement of the orbit contents, due to a dilatation of the frontal and ethmoid sinuses without inflammatory signs; the so-called mucocele. The treatment consists of establishing free drainage by removal of the lower wall of the frontal sinus, and the entire ethmoidal labyrinth. In inflammatory conditions, if the inflammation invades the intervening bony wall, there results (a) in miid cases a periostitis with swelling and redness of the eyelid or over the ethmodial os planum, causing exophthalmos; (b) in an extension of the process there will be found a circumscribed defect in the bone, the pus forming a subperiosteal abscess which remains encapsuled, or extends forwards and perforates the skin of the eyelid. The orbital contents are usually uninvolved in these cases beyond a venous congestion of the optic disk. When the orbital periosteum is invaded, involvement of the orbital structures there results in cellulitis or abscess with inflammation of the optic nerve.

Knapp quotes Birch-Hirschfeld as concluding that nearly all the orbital inflammations are due to nasal sinus empyema, hence treatment should be based on the lines of the orbital operation for nasal sinus disease.

The optic nerve presents a very important complication of nasal sinus disease. The effect of sphenoidal sinusitis on the optic nerve has been known for some time, but Onodi has recently shown the optic nerve's very frequent close relation with the posterior ethmoidal cells, and the position makes the involvement of the nerve more likely than in the case of the sphenoid. The nerve involvement takes the form of a retrobulbar neuritis with a central scotoma the characteristic functional defect.

Again, ocular paralyses are not infrequently the only manifestation of the orbital complication.

Neuralgia, especially ciliary, and retrobulbar, is frequently due to sinus affections, as is asthenopia.

He quotes Kuhnt, who believes the functional disturbances observed in nasal empyema to be, in the order of their frequency, muscular asthenopia, accommodative asthenopia, and contraction of the visual field.

Knapp continues by saying that additional information is necessary before we can consider such eye affections as irido-chorioiditis, glaucoma, and detachment of retina to be dependent on sinus disease.

He again quotes Kuhnt, who says he has never seen a case of irido-chorioiditis caused by sinus disease, but thinks that cyclitis, especially the form characterized by opacities of the vitreous, may depend on this cause. He has never observed glaucoma to be caused by nasal disease, but believes that in predisposed eyes an attack may thus be brought on.

In concluding, Knapp believes the list of ocular disturbances brought on by sinus disease is not exhausted and that a deal of careful work is required to complete our knowledge of the relations of nasal sinus disease to diseases of the eye.

G. H. W.

Labyrinthine Nystagmus and Labyrinthine Disease.

McKenzie, Dan, London, Eng. (*Journal of Ophthalmology and Oto-Laryngology*, July, 1909), says that, labyrinthine nystagmus distinctly differs in appearance from the nystagmus we are familiar with in insular sclerosis and certain ocular disorders, in which the oscillations are regular, the to-and-fro excursions being equal in rhythm. In the nystagmus which follows stimulation of the vestibular nerve, on the other hand, the oscillations are unequal, one excursion being slow and the other quick. Vestibular nystagmus is thus made up of two phases, (1) a slow deviation of the eyeball from its position ("the long phase"), followed by (2) a short twitch of the nystagmus is directed towards the direction of the nystagmus is "directed towards the right." It is a feature of short movement. When, for example, during the slow phase, the eye deviates towards the left, and is caught back again towards the right during the short phase, we say that the nystagmus is "directed towards the right." It is a feature of labyrinthine nystagmus that its oscillations are exaggerated when the eyes are turned in the direction of the short movement, and diminished or abolished when the eyes are turned in the direction of the slow movement. M. L. F.

Reflex Aural Symptoms Caused by Eye Strain.

THEOBALD, SAMUEL, Baltimore (*Jr. A. M. A.*, July 10, 1909), calls attention to the influence of eye strain upon the auditory apparatus. He refers to his previous mention of tinnitus aurium; and, from experience, is convinced that this condition deserves greater consideration than it has, so far, received. While tinnitus is the aural reflex which he has most frequently observed there are others which are described as a "muffled" or "stuffed" sensation in the ear, pain around and in front of the ear, and impairment of hearing. Of tinnitus due to eye strain he has observed three varieties—the vascular type, the whirring or fluttering sound, and the intermittent tinkling. Proof of the ocular origin of these aural sensations is found in the fact that they disappear after relief of the eye strain; that the affected ear is usually the one on the same side as the more troublesome eye; that they are more pronounced when the eye strain is most annoying, and are brought on or intensified by the use of the eyes. The ocular trouble is often astigmatism of a high degree and associated with other marked refractive errors, but in some cases it is chiefly heterophoric. From the fact that the nerve supply of the tensor tympani is derived from the motor branch of the fifth nerve; and the stapedius receives a twig from the seventh, it is easy to see how eye strain may produce irregular contractions in these two muscles as in the orbicularis. The writer reports four cases illustrative of his theory, which are not altogether convincing.

O. W.

Amaurotic Family Idiocy; Histological Examination of a Case in Which the Eyes Were Removed Immediately After Death.

VERHOEFF, F. H. (*Archives of Ophthalmology*, March, 1909), remarks that the pathological changes in the eyes were confined to the ganglion cells of the retina and the fibers of the optic nerve. All of the ganglion cells were degenerated but those in the macula were most profoundly affected, corresponding to the degeneration of the optic nerve, which was most marked on the temporal side. There was no degeneration of the rods and cones and no undue tendency of this layer to adhere to the pigment epithelium; nor was there any oedema of the macula. The changes found in the brain corresponded with those in other reported cases. Although the eyes were not myopic, the optic nerve entrance presented the appearance regarded as characteristic of myopia. It would seem, therefore, that this condition of the optic nerve entrance is not necessarily the result of myopia, but may be inherited along with a tendency toward the latter.

H. G. G.

The Ocular Manifestations of Hysteria.

TIVNEN, RICHARD J., Chicago (*Journal of Ophthalmology and Oto-Laryngology*, December, 1908), claims that the chief ocular manifestations of hysteria, amaurosis, amblyopia, reduction of the visual acuity, contraction of the visual field, disturbance of the color field, anomalies of the accommodation, anomalies of the eyelids and disturbances of sensation, are of distinct diagnostic value though seldom sufficient to establish a diagnosis by themselves. They must be considered in connection with the general manifestations of the disease.

M. L. F.

An Improvement on the Cross-Cylinder.

RHOADES, J. N., Philadelphia (*Ophthalmic Record*, April, 1909), says the cross-cylinder is much more efficient when an empty ring is attached to its handle. This ring should have the same diameter as the cross-cylinder, 1 1/4 inches, and when ready for use should stand at a right angle from the other ring, or when the 1 1/2 inch is used it may be allowed to hang down thirty degrees obtusely, but when closed, should exactly coincide with the cross-cylinder ring. The writer claims that this new instrument can be held in eighteen positions while testing, and believes that the empty ring used with spheres, plane cylinders or cross-cylinders, is a fundamental principle in case-testing, and will be so regarded ultimately. O. W.

Amethyst-Tinted Lenses—A Preliminary Communication.

Fox, Webster L., Philadelphia (*Jr. A. M. A.*, July 10, 1909), states that ophthalmologists have been constantly confronted with the problem what color is best incorporated with glasses to protect the eyes from harmful influences, and says that he was first led to use the amethyst-tinted glasses in 1887, by noting that dentists became gold-blind. This fact suggested the idea that the yellow of the gold was productive of over-stimulation of the retina, and that a remedy might be found in the amethyst-tinted glass of some old Philadelphia windows. He obtained some of this glass, and had a pair of spectacles made for a dentist from it, which quickly relieved him of gold-blindness. A similar effect was obtained in several other cases which led him to investigate the phenomenon of the coloration. Some window glasses after having been exposed to intense sunlight for some time develop a violet coloration varying in shade according to the time of exposure. In 1905, Sir William Crookes presented to the Royal Society two panes of glass which had been colored a deep violet by being exposed to sunlight in South America, at an altitude of almost 1,500 feet, and it would seem that the ultraviolet rays had caused the coloration. The writer has graded the color into three shades and uses them according to clinical conditions. The results of their use have been most satisfactory, especially in cases of asthenopia and in those who do close work under artificial light. O. W.

A Modification of Buller's Shield.

Knapp, Blaker J., Evansville (*Ophthalmic Record,* April, 1909), gives a description as follows: It is made of flexible collodion, cotton, and a large, deep watch crystal. The bridge and side of the nose, and the infraorbital ridge are built out with layers of collodion and pledgets of cotton, thus forming a circular ridge upon which the watch crystal rests evenly, and clear of the media when the eye is open. The crystal is fastened on by covering its edge with cotton and collodion, an opening being left at the temporal side for ventilation and application. The freedom of movement afforded to the unaffected eye is a comfort to the patient, and the collodion covered cotton seems to afford perfect protection.

O. W.

An Iris Forceps.

FRANCIS, LEE MASTEN, Buffalo, (*Ophthalmic Record* April, 1909), describes an iris forceps, which, though small and light, can be manipulated more easily than a larger and stronger instrument. The teeth are in the rear, and are smoothed down so that when the blades close no uneven surface is presented. The wide grasp for finger and thumb permits a steady hold; the blades open readily and are easily controlled. It is made with an aseptic lock and threaded pin, is easily cleaned, and on account of the crossed blades, may be introduced through a very small corneal incision.

O. W.

Prognosis in Eye Diseases Viewed from the Standpoint of the Patient's Rights and the Ophthalmologist's Duty.

DUANE, ALEXANDER, New York (*New York Medical Journal*, July 19, 1909), urges greater care in the expression of prognosis to a patient and maintains the following propositions:

1. An error in prognosis is often more disastrous to the patient and more humiliating to the surgeon than an error in diagnosis or in treatment.

2. Be the condition ever so desperate we are rarely justified in admitting even to ourselves that the case is hopeless and that nothing can be done; to make such a statement to the patient, except in the very rarest instances, is needless and often very pernicious cruelty. This is so because (a) our diagnosis and prognosis are necessarily fallible. (b) Even if the diagnosis is accurate and the prognosis apparently so according to present standards, we never know how soon some new discovery may change our views of the one or the other. Only recently we have learned that sometimes an apparently intractable uveal disease may be relieved by tuberculin; optic neuritis that we once would have considered irremediable may be relieved by decompression; an optic nerve atrophy

that we would have held to be inevitably progressive may be arrested by operation on the accessory sinuses; and an impending suppuration in the eye may be stopped by staphylococcus vaccine. So other conditions which to-day we regard as incurable may be susceptible of amelioration to-morrow because of some discovery as yet undreamt of. (c) Even if the case in hand is really hopeless, we have no right to deprive the patient of the blessings of hope. In particular, we have no right by predicting an unfortunate outcome to give him the needless suffering of an anticipated evil which is often worse than the suffering of an evil realized.

3. Brutal positiveness, often regarded as an evidence of honesty, is more frequently a sign of sheer selfish inconsiderateness on the part of the surgeon, who will not take the time or trouble to mitigate the blow he is inflicting nor give the patient the explanations necessary to qualify his downright assertions. Sometimes such positiveness is simply a mark of ignorance; the expression of a hastily formed and erroneous opinion.

4. If we maintain a cheerful and determined optimism we not only help the patient to bear his troubles, and by giving him hope, prevent much suffering and mischief, but we are ourselves stimulated to make greater exertions in his behalf and are prevented from degenerating to the dead level of routine treatment or to the depths of an actual therapeutic nihilism. We shall find, too, I believe, that in most cases the exercise of such optimism, by making us more careful in prognosis, makes us also more careful in diagnosis. We are more apt to find out all the points of a case, if we are seeking with all our power to find something favorable to tell the patient or something upon which we can base some kind of treatment. Certainly those who make "snap" prognoses are very apt to make "snap" diagnoses as well.

5. In pursuance of this optimism, we should strive to emphasize the favorable points of the patient's case, call attention to the fact that he is holding his own, attend with sympathy and patience to his complainings, and lay stress on any factors in his case that we can ameliorate. For we must remember that in chronic progressive conditions many of the patient's symptoms, at least, can be helped, and the relief of these, even when we think them nonessential, may be of vast importance to him. Slight improvement of the sight by glasses, or adjustment of the latter to the conditions under

which the patient uses his eyes, may make all the difference between useful and useless vision. This is particularly so in cataract. corneal opacities, keratoconus, and progressive myopia. Here too. it is especially necessary to keep the patient under observation. as changes in the glass will be necessary from time to time, and unless these are made the patient will get the false impression that his sight is deteriorating. Again, in these and other progressive eye affections relief of external irritation may help the patient greatly even when the sight is not improved. In myopia and in cataract potassium iodid sometimes aids considerably in clearing up a vitreous opacity. In progressive cataract the use of mydriatics from time to time may give the patient useful sight during a period when sight may be of the greatest value to him.

6. Even when there is nothing much we can do, the patient often derives encouragement and satisfaction from the sympathetic cheerfulness that we have the power to give him when he visits us. To many this is a help of inestimable value, and one that it is our duty to bestow. For we must remember that we are not simply oculists but physicians, and that. even if we accomplish nothing for the patient's eyes by our consistent optimism and persistent treatment, we may yet accomplish much for his bodily and mental welfare and we are bound to do so if we can.

7. There are some cases, of course. in which optimism would be wrong. There are patients who have to be handled without gloves, and who have to be frightened or dragooned into obedience. In such cases brutal frankness is necessary, provided always that by it we can secure some good to the patient. I would never, for example, smooth over the prognosis where there is danger of smypathetic inflammation, but would say in the plainest and directest terms that the patient must lose his offending eye if he hopes to save the other. In general, however, this sort of frankness is best reserved for the patient's friends. Even to them our statements should be qualified by an avowal of the fallibility of our judgments. To the patient our prognosis should be as encouraging as possible; our demeanor sympathetic and cheerful; our treatment such as will best relieve his symptoms, so that if we cannot cure or even arrest his trouble we shall at least make him the better for having seen us. In this way we shall best subserve the patient's interests and perform our duty as ophthalmologists and physicians. M. L. F.

ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

(GREAT BRITAIN AND THE ENGLISH COLONIES.)

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Retrobulbar Neuritis Simulating Hysteria.

REBER, WENDELL, (*Ophthalmoscope,* July, 1909). The case reported is one of retrobulbar neuritis which so closely simulated hysteria that it was only after following it carefully for several days that a diagnosis could be made.

The patient, a dentist, was first seen in 1897, when he was treated for severe infected corneal ulcer of the left eye. He had previously contracted syphilis and followed a course of iodide for some months. Six years later he was again seen complaining of slight blur before left eye, phosphenes and suggestion of violet vision at times. Right eye normal. Ten days later he showed a gradually increasing swelling of the nerve head with dark and tortuous veins.

Visual field revealed a central relative scotoma for red. The nerve head became swollen to three diopters and a small retinal hemorrhage appeared. Urin analysis was negative. Under Turkish baths and vigorous mercury treatment, the condition improved, resulting in an astonishingly good looking nerve head and vision of 2/3 eccentrically.

Six years later (February, 1909), the patient again returned, complaining of pain in the right eye on motion of eye, some photophobia and phosphenes, adding that the sensations were just such as had preceded the previous attack of optic neuritis in the other eye. Examination showed the vision 2/3 of normal, some injection of the deep ciliary muscles, no tenderness and no tension, media clear and fundus normal, except for a very low grade hyperaemia of the optic nerve head. The skin of the lids and the conjunctiva of the right eye were anaesthetic, and the cornea also reduced in sensibility. The same was true of the left eye except that the cornea was of normal sensibility. There was also hyperaesthesia of the arms along the distribution of the ulnar nerve. The vision fell to 5/12, but no change in nerve head observable. The form field showed marked temporal contraction and dyschromatopsia of red and blue, the blue also extending beyond the form field in one place, no scotoma. A tentative diagnosis of hysteria was made, but because of the previous retro-ocular neuritis, the patient was studied from day to day. Five days later the nerve head showed unmistakable slight inflammation and swelling of the nerve fibres. The patient was put immediately on pilocarpin and mercurial treatment but the swelling increased to 2 diopters with two tiny linear retinal hemorrhages. The veins were very dark and tortuous. The visual field revealed an absolute central scotoma for white and about twice as large for red. The diagnosis of retrobulbar neuritis, probably of specific origin, was made evident. The condition steadily improved, and two months later the nerve head presented a normal aspect in every respect, and the vision reached 5/5.

The author commends the suggestion of Bergmann, that just as retrobulbar neuritis may depend upon some primary disturbance of metabolism, so also may hysteria, the unknown toxin working, on the one hand, on the optic nerve, and on the other, on the brain. W. R. P.

Remarks on the Use of Calmette's Ophthalmo-Reaction for Tuberculosis.

Harrington, A. W., and Ballantyne, A. J. (*Ophthalmoscope,* June, 1909). The authors report the results obtained from the ophthalmo-reaction for tuberculosis, in a series of cases in which they used the various forms of tuberculin preparations put up by the different wholesale chemists, in both liquid and powder forms. The test was applied in 139 cases ranging from 10 months to 66 years in age. Each one was first carefully examined to ascertain whether there was any clinical evidence of tubercle. Only a single drop was used in each case, of either the prepared liquid or of the dried preparations after solution in the prescribed quantity of distilled water. It was instilled in the lower conjunctival sulcus, the lids kept apart for a few seconds and the patient warned to avoid forcible closure of the lids. Fresh solution was always used in varying strength of .25% ; .5% and 1%, and application never made twice to the same eye.

The cases were divided into: (1) Clinically tuberculous (including all cases suspected of tuberculosis, whether the tubercle bacillus or other conclusive evidence of tubercle was found or not), 16 cases, of which 12 gave positive reaction = 75% ; and (2) the clinically non-tuberculosis, 123 cases, of which 39 gave positive reaction = 31.7%. The tests of the tuberculosis cases were as follows:

With the 0.25 per cent. solution 4 cases with 3 positive results.

With the 0.5 per cent solution 6 cases with 5 positive results.

With the 1.0 per cent. solution 6 cases with 4 positive results.

The four tuberculosis cases which gave no reaction were tested with a 0.25 per cent., 0.5 per cent., 1 per cent., solutions respectively.

In the 123 non-tuberculosis cases:

With 0.25 per cent. solution 48 cases gave 27% positive reaction.

With 0.5 per cent. solution 46 cases gave 29.8% positive reaction.

With 1 per cent. solution 29 cases gave 41.3% positive reaction.

"It is a somewhat striking fact that the 1 per cent. solution of one firm seemed to be inert, producing no reaction in 14 non-tuberculosis and one tuberculosis subject, while the 1 per cent. solution of another firm gave 80 per cent. of positive results in both tuberculous and non-tuberculous. With these results before us we could not place much reliance on the occurrence of a positive reaction, while, on the other hand, the failure to react seems to have a certain value as indicating the absence of tubercle."

Safety of the Reaction.—Departure from the commonly described type of reaction are not uncommon. The duration of the reaction tended to be longer than the 2 or 3 days commonly stated. Five or six days was more common, and in some cases the effects lasted for 15, 21, 31, and even 60 days. The average duration was 10 days. The conjunctivitis was practically uninfluenced by remedies, but lotions of 1% sodium chloride and instillations of argyrol were usually found grateful to the patient.

The positive reaction showed a thickening and hyperaemia of the lower palpebral conjunctiva, particularly the plica and caruncle, some hyperaemia of the bulbar conjunctiva with a small amount of catarrhal or fibrinous exudate. As a rule, even with a well marked or excessive reaction, no pain was complained of

"Some of the unusual or additional effects of the reaction were: edema and thickening of the lids, marked bulbar injection, phlyctenular nodules on the bulbar conjunctiva, granular elevations on the bulbar conjunctiva, follicular hypertrophy or actual granulations in the palpebral conjunctiva, swelling of the submaxillary gland, chemosis, conjunctival ecchymosis, inequality of the pupils, drooping of the eyelid, delayed reaction, bilateral reaction, and relapsing reaction. In several cases in which the reaction was of the usual duration and caused no pain, the amount of discharge and redness was such as to cause the patient some alarm. No elevation of temperature was found which could be traced to the application of tuberculin.

Several of the non-tuberculosis cases which gave a positive response, had a marked anemia, but, on the other hand, there were cases which gave a well marked reaction in which there was no anemia, and others with pronounced anemia did not react

Four cases are cited to illustrate the atypical results obtained. One case in which the reaction was pronounced, developed a small, yellowish, translucent nodule up and in from the cornea and surrounded by conjunctival injection, which disappeared after a month.

Another case showed a well marked reaction with mucopurulent discharge 24 hours later. Eighteen days later eye was still injected and other eye became injected and sore. Two weeks later a relapse occurred in the right eye after being practically well and two phlyctenular nodules developed on the outer side of the eyeball.

The case of a woman, aged 46, developed a persistent thickened granular condition of the lower palpebral conjunctiva. A large number of minute, transparent elevations were scattered over the bulbar conjunctiva.

One patient with cancer of the liver developed a marked reaction followed by ecchymosis extending over the whole globe except above. The hemorrhage cleared in ten days.

"While none of our cases suffered any permanent injury from the test, nevertheless some of the results were sufficiently disconcerting to make one timid in using even the weaker solutions, and that much more serious consequences may arise is clearly established by the increasing number of such cases now being reported, a considerable number of which have been collected by Dr. Ernest Thomson.

"As the result of our experience of the test, small though it be, we are forced to the conclusion that it is neither safe nor reliable. We are aware that some writers have found it both safe and reliable, but the experience of others has agreed more closely with our own, and until this inconsistency is explained and the method so modified as to give uniform results in the hands of all reasonably careful observers, the test cannot be recommended for universal application."

W. R. P.

On the Work of the Ophthalmic Ward in St. Paul's Hospital, Liverpool.

Walker, A. Nimmo (*Ophthalmoscope,* June, 1909). A report is submitted of the results obtained at the Ophthalmic Ward of St. Paul's Hospital, Liverpool, since its establishment nearly 18 months ago. This ward for the treatment of ophthalmia neanotorum, was an innovation and at present has but four beds and four cots, which number, however, is expected to be increased soon.

The method of procedure is as follows: Upon the discovery of any inflammation in an infant's eyes, the Health Authority is at once notified by the midwife or physician and the lady inspector visits the case and sees that the proper arrangements are made to take the child to the hospital. There it is seen by the surgeons and, if necessary, detained and the ambulance sent for the mother who is put in a special ward with the child.

Some of the cases are treated in the out-patient department, either because the mother is unable to come or because of lack of beds, and the child is brought several times daily for treatment. Instructions for treatment at home are also given. This treatment has not been as satisfactory as in the in-patient department. As to the inadvisability of moving the mother so soon after confinement, only five out of forty-four mothers have given trouble, and in only one case could the trouble be ascribed to the removal of the patient and this was quickly cured.

The duration of the disease and chance of recovery was found to vary directly with the elapse of time between the onset of the disease and admission to the hospital.

Of 75 cases, both eyes were saved in 57. One eye saved in 7, blindness resulted in 7, and no record obtained in 4. Of the seven blind cases five had both eyes sloughing on entrance to the hospital, one baby had no power of resistance and died a month after discharge, and one was transferred to the out-patient department when nearly well; suffered an exacerbation at home and when next seen had sloughing of both corneae.

The efficiency of hospital treatment is well shown by the fact that in 150 eyes, 126 entering with cornea intact, 116 were intact in the final results; of 7 with cornea slightly affected, 6 showed similar results after discharge, and where 17 were admitted with both corneae severely affected, 20 had severe affection of the cornea later; in 8 cases no record of final results could be obtained.

A further analysis showed a remarkable improvement in the second half year compared with the first, coincident with the diminution in the duration of the disease before the child is brought to the hospital, which fell from an average of 23.6 days to 6.7 days. This diminution is mainly due to the interest aroused in Liverpool and the efforts made to educate the midwives in this subject.

One important phase is the prophylaxis of the midwives in which they bring the cases to the hospital for examination if they suspect danger from the condition of the mother. Different methods of treatment are being investigated. The writer believes that the year's working has shown the scheme to be practicable and that the co-operation of the Health Authority is the best method of dealing with the disease.

W. R. P.

A Theory of Diplopia.

Sallom, Abdullah Kalil, and Sallom, Mary (*Ophthalmoscope,* June, 1909). The authors recall briefly, certain well-known facts in anatomy and pathology, from which they evolved their theory concerning the fusion nominally of the two retinal images into a single image and the diplopia resulting under certain conditions

1st.—That the fibres coming from the nasal side of one eye, and the temporal side of the other eye, represent the same visual field, and terminate in an arborization around cells in the external geniculate body, pulvinar of the optic thalamus and brachium of the anterior copora quadrigemina.

2nd.—That the dendrites of the cells in the lower visual centers come in close relationship with the terminal arborization of the nerve fibres coming from the retina.

3rd.—That more than one fibre influences a given cell.

4th.—That destruction of definite parts of the cortex will cause blindness of definite parts of the retina.

5th.—That we have a set of fibres that connect one visual area in the cortex with the visual area of the other side.

6th.—That the fovea is represented in both the visual areas of the cortex so that destruction of one of these areas will not cause total blindness of the fovea.

Under normal conditions rays from an object in the left peripheral field of vision fall upon identical points of the retinae and the visual impulses are carried from both retinae to the right primary optic centers either the anterior geniculate body, the anterior copora quadrigemina or the optic thalamus, where they terminate in an arborization in close relation to a single cell. This cell takes up the impulses from both fibres and conveys them to the cortex where a single images is formed, as only a single impulse is received. If one eye is closed the impulses which influence the cell are weaker than when both eyes are open and two impulses are operating upon the same cell. Hence we see better with two eyes than one.

In convergent strabismus, the impulses fall upon non-corresponding points of the two retinae and are carried by fibres ending around different cells in the primary optic centers, but on the same side of the brain. Two different cells having been stimulated, two different impulses are carried to the cortex and two images formed. As both images are on the same side of the brain we have homonomous diplopia. This explanation is a step further to that already offered that the impulse received in the left eye will be projected to the left field of vision because we have learned to so project it by experience.

In divergent strabismus, the same is true except that cells in the primary optic nuclei on opposite sides of the brain are stimulated and the impulses carried to form images in the opposite cortices. The image received by the right eye is formed in the right visual area of the cortex, and that in the left eye is formed in the left area. The right image is therefore projected to the left visual field, while the left image is projected to the right visual field and crossed diplopia results.

The fovea is represented on both sides of the cortex and destruction of one side does not cause total blindness of the fovea. There are no nasal and temporal halves in the fovea. One point in the fovea will carry impulses to the same side and the adjacent point will carry to the cells on the opposite side. In other words, we have no definite area in the fovea where the fibres that go to the same side and those which cross are grouped. As a result, only one-half of the image is formed on the right side in the cortex, while the other half is on the left side, the image being made whole by the fibres which connect the two visual areas in the cortex. Destruction of one of the visual areas shuts off half of the impulses received, and hence the defect in visual acuity.

In conclusion, the authors summarize as follows:

1st. That fibres coming from identical points of the retinae end around and influence only one cell in the lower visual center. This cell takes up the impulse and carries it to the cortex. Therefore, whether the impulse is carried by the fibre coming from the right eye, or from an identical point in the left eye, or both, but one cell can be influenced and one image can be formed.

2nd. If non-identical points are stimulated, two cells in the lower visual center are influenced. Each cell carries the impulse which it has received to the cortex. Two images are formed since two impulses have been received.

3rd. When one eye is turned inward, the image formed by the opposite eye, on account of the anatomical structure, will be external to the image formed by the one on the same side. Therefore, both images will be projected to the opposite field of vision, and the image formed by the opposite eye will be in either visual field, external to the image formed by the eye on the same side. Hence, the images correspond in position to the eyes.

4th. For the same reason, when one eye (for example, the left) is turned away from its fellow, its image will be formed in the left cortex, and the image from the right eye will be formed in the right cortex. The right image is projected to the left field of vision, and the left image is projected to the right visual field—hence the images are crossed.

5th. As there is really no nasal half in the fovea where the fibres that cross are grouped, and no temporal half where the fibres that go to the same side are situated, and as the fibres going to the same side and those passing to the opposite side are situated side by side, therefore only one-half of the image is formed on the right side of the cortex, while the other is formed on the left; the image being made whole by the fibres which connect the two visual areas in the cortex.

W. R. P.

Metastatic Gonorrheal Conjunctivitis. Demonstration of the Gonococcus in Smear and Culture.

McKee, Handford (*Ophthalmoscope,* July, 1909). The author reports a caseof gonorrheal conjunctivitis which he believes was undoubtedly of metastatic origin, the diagnosis of which was confirmed by the demonstration of the gonococcus in smear and isolation of the organism on culture media.

Of the two forms of gonorrheal infection of the eye (1) gonorrheal ophthalmia, due to direct infection, and (2) metastatic gonorrhael conjunctivitis, the latter, while well understood clinically, has nevertheless been much speculated about as to its aetiology. Bacteriologically, the results have been largely negative, and several theories have been advanced. Axenfeld, in 1899, advanced the theory that this form was due to the action of the gono-toxin. A second theory was that it was due to a mixed infection, the gonococcus or its toxin preparing the way for the ordinary pyogenic bacteria. The view that true metastasis takes place is evidenced by the fact that the gonococcus has been found in the conjunctival secretion by such observers as Lipski, Morax, Van Moll, Burchardt, Kurka and Knapp.

The diagnosis of the case reported was made chiefly from clinical evidence. A young man, aged 18 years, under treatment some months for gonorrhea, noticed redness in both eyes, which increased, the right eye becoming painful. Intense congestion of both bulbar and palpebral conjunctiva, except at the corneo-scleral margin, with a profse muco-purulent discharge ensued. The picture presented was that of a severe acute pneumococcic or Koch-Weeks conjunctivitis. The following day he developed an arthritis of his large toe on the left foot, which was diagnosed as gonorrheal rheumatism.

With the onset of the inflammation in his eyes, the urethral discharge had stopped. The eyes were treated with irrigation of the conjunctival sac with warm boric solution and in eight days the conjunctiva had cleared. One week later the conjunctivitis recurred in the right eye, but was again better the next day. The knees became involved in the arthritis and the urethral discharge again appeared. One month later he again developed a conjunctivitis, his eyes becoming like "balls of fire," which again cleared up after three or four days.

The diagnosis of metastatic conjunctivitis was made from: (1) the onset and course of the inflammation; (2) the absence of clinical signs of exogenous infection; (3) the coincidence of conjunctivitis with other systemic gonorrheal manifestations; and (4) the bacteriological report.

It was only after careful examination of 18 smears that the organism was found. A culture was obtained, after repeated inoculation upon various media, from a tube of hemoglobin-agar, and the diplococcus isolated. Comparison was made with morphologically similar germs and the gonococcus carefully differentiated

A snipping from the palpebral conjunctiva in paraffin section showed epithelium studded with polymorphonuclear leucocytes. The subepithelial tissue showed edema of the vessels, some peri-vascular infiltration with lymphoid and plasma cells. Lymphatics were dilated and the engorged vessels contained numbers of polymorphonuclear leucocytes traceable in unbroken path to the epithelium. No micro-organisms were found.

Stock has shown that organisms causing a metastatic inflammation produce a much milder form than when directly infecting. The virulence of the urethral infection may have been attenuated before the eye became inoculated, accounting for the mild course of the conjunctivitis.

In conclusion, the author says: "The interesting points in this case, giving us a typical picture of a metastatic conjunctivitis in gonorrhea, are as follows: The retropulsion of the old writers was very definite; although urethral discharge had been present from three to four months, with the onset of the eye symptoms the discharge stopped. Subjective symptoms were present from three to four days. The onset of the conjunctivitis was indefinite, and simultaneous in both eyes, following sexual excess. The previous history of the patient was good, and, in particular, there was no rheumatism. The clinical picture and the course of the conjunctivitis, almost without treatment, were mild as compared with exogenous type. The tendency of the conjunctivitis was to recur and to remain a conjunctivitis, as it does in 65% of the cases The rheumatism occurred shortly after the conjunctivitis, and ran a typical course. Our interest, however, in the present case centers around the bacteriological report. As has been stated, some writers give the absence of the gonococcus from the secretion as an important point in differential diagnosis, and attribute the metastatic inflammation to a toxin. More likely, the gonococci were present, but owing to faulty methods, were not found. The organisms must necessarily be few in number, and a bacteriological report from the examination of one or two slides shows one how easily error may creep in.

"We believe that the present case makes proof available that metastatic conjunctivitis is not due to a mixed infection that it is not caused alone by the gonotoxin, but that it represents a true metastasis of the gonococcus." W. R. P.

Miner's Nystagmus.

BUTLER, T. HARRISON (*Ophthalmoscope,* August, 1909). The author, after entering into the symptomatology of miner's nystagmus, discusses the various theories that have been advanced as to its etiology, endorsing the idea of cerebral incoordination as accounting for all the facts more completely. A brief statement of the treatment is added.

Miner's nystagmus is essentially a disease of the collier, appearing only after some years in the pit, except in some instances where it has appeared early, when it is generally severe. It is not present in other occupations where the employees work in cramped positions or in feeble light or darkness.

The characteristic nystagmus may be vertical, horizontal or circular and may be of different types in the two eyes. The vertical variety is rare, the commonest types are horizontal and circular, varying from 120 to 500 oscillations per minute. The nystagmus is elicited by having the patient look up, in the early stages to strain up, but as the disease progresses the oscillations commence when the eyes are only slightly elevated, and Romiee has suggested that the severity of the disease may be measured by the angle of regard above or below the primary horizontal position at which the movements appear. In a very advanced case, there is a condition of great nervous excitability, the oscillations are violent and constant, the eyelids twitch and the hands tremble. Head position, per se, has no influence on the disease, the oscillations can be induced in a supine position, providing the subject looks toward his forehead.

Hemeralopia is present in about 5% cases as estimated by Drausart. The patient sees objects on the ground as well as a normal individual, but darkness induces nystagmus, and the lights dazzle him and everything dances. The author has seen but two cases where night blindness was present, and then only to a moderate degree. Visual acuity is generally quite normal when the eyes are at rest, but when the nystagmus comes on, it may fall to 6/60. In contra-distinction to ordinary nystagmus, all objects appear to the patient to be in rapid motion, the lights in the colliery dance and he cannot do his work.

The author takes exception to Simeon Snell's opinion that acquired nystagmus is occasionaly present in other trades as well as among colliers, as he believes the twenty-two cases cited are not examples of real acquired nystagmus, but rather cases of asthenopia with nystagmoid movements. Miner's nystagmus must be differentiated from that of insular sclerosis, which may closely simulate it at times. "It can be truly said that miner's nystagmus is confined to the colliery."

The disease seems to have appeared with the introduction of the Davy safety lamp, by which the illumination was reduced from 0.5 to 0.28 candle power. With the improvement of the illumination, the disease has shown a tendency to diminish. While more common among the "holers," i. e., the men who lie on their sides and undercut the coal, it is not confined to them.

There are several theories as to the etiology of miner's nystagmus. Snell, Drausart and Neiden have championed the theory that it is due to the cramp of the elevators of the lids and eyes. Rominee is alone in his belief that it is due to excessive accommodation in a bad light. Peter's theory is that the nystagmus is caused by apparent impulses from the semicircular canals, whose functions have been modified by the position assumed by the miner at his work. It is also said to be due to the inhalation of fire damp, which is chiefly composed of marsh gas, and by the general vitiated condition of the air in the pits. The only view which fully accounts for all the facts and which accepts as causal factors both the myopathic element and the bad light factor, is the theory supported by Reid and Nuel, that nystagmus is due to a failure of co-ordination from a central cerebral disturbance.

The myopathic hypothesis, so frequently quoted in the text books, is entirely inadequate. The fatigue curve of a muscle shows not a clonic, but a tetanic contraction; hyperphoria is seldom present in the disease; and many cases of extreme hyperphoria with severe muscle strain do not show nystagmus. Neither can the poor illumination be the sole cause of the condition, for photographic plate makers never develop it.

"In feeble light we do not see with the cones, but with the rods. The fovea has no rods, and the retina immediately around it only a few. That which we can call the visual acuity of the rods is at its maximum in a retinal band surrounding the fovea at a distance of from 15° to 20° from it. In this annular ring the visual acuity is practically everywhere of the same value. In a good light we fix with the fovea, but in the poor light of the mine the miner can fix at any place on this perifoveal ring; he has no retinal directing point; the necessity for accurate central fixation is absent. In consequence, there may be failure of co-ordination (Nuel). Also the crystalline surface of the freshly fractured coal, with its myriad reflecting facets, causes a struggle between the two visual fields, for each eye perceives a different facet. So binocular vision is impaired, and a tendency towards failure of co-ordination is encouraged. This factor, a black crystalline surface, is the only one which is always present in the coal mine, but absent from other situations where men work in a poor light, as, for example, in a zinc mine, in a boiler, or in a photographic dark room."

The light factor is most important, for there is no doubt that nystagmus is far more common in safety lamp mines than in candle mines, where the illumination is much better. The darkness of the mine is a powerful adjunct in the production of nystagmus, but not the sole cause. Reid, in his valuable article in "Brain," advocates the idea that miner's nystagmus is due to a disordered co-ordination, a disturbance of the brain centers which control the equilibrium of the eye. "The necessity of fixation being absent, owing to the small part taken by the superior macular image during dark adaptation, the eyes easily escape from control, and the habit, unconsciously acquired, of following the swinging pick with the eyes tends to persist."

As yet, so little is known of the processes which go on in the brain that in talking of disordered co-ordination, a name is but given to a symptom complex and the explanation transferred from the realm of concrete science to that of metaphysics.

"We are, finally, logically compelled to admit that miner's nystagmus, like that which appears in disseminated sclerosis, is a cerebral symptom; it is the result of the miner's work, which, in some way which we cannot understand, disturbs the ocular equilibrium in such a manner that rhythmic oscillations appear.

"The treatment of miner's nystagmus is very simple. Work in the pit must be entirely and permanently abandoned. Cure may result in a few months, but some cases last for years, and otheres are incurable." W. R. P.

Methods of Cataract Extraction; A Critical Review of the Methods at Present Advocated.

Parson, J. Herbert (*Lancet*, July 17, 1909). The advantages and disadvantages of the different methods of extraction are discussed. By well-nigh universal consent the section is made upward, should not exceed half the circumference of the cornea and should end in a conjunctival flap. Iridectomy in some form or other is common to the combined operation and to extraction in the capsule as prominently advocated at the present day by Major Smith. The coloboma should not be large. Various modifications of iridectomy are discussed. The author is in favor of making a small buttonhole in the periphery of the iris as it fulfills the main requirement of iridectomy with much less mutilation and with the retention of the circular pupil. This should be done after the lens has been extracted as in simple extraction.

Relative to the capsule, the chief objects to be kept in view are the removal of a maximum amount of the anterior capsule and the avoidance of incarceration of tags of capsule in the wound. Greater accuracy in opening the capsule is insured by performing it as the first steps in the operation; i. e., needling it as in an ordinary discission operation, using a needle which will prevent loss of the aqueous.

The chief advantages of simple extraction are: Simplicity of the operation, including especially minimum of mutilation, of instruments required, and of the instruments introduced into the interior of the eye; optical advantages of a round pupil-minimal dazzling, best visual acuity, and best field; cosmetic advantage of a round pupil, ease of reposition of the iris; minimal danger of incarceration of capsule in the wound, infrequency of prolapse of vitreous; greater protection of deeper parts of the eye from infection, absence of pain and bleeding from cutting the iris. Of these it may be remarked that the optical advantages are not overwhelmingly manifest. The cosmetic effect is rarely of sufficient importance to outweigh the risks, though occasionally it is a justifiable argument as in the case of an unsightly unilateral cataract in a young woman, or in a man in whom it forms a bar to obtaining employment. It is doubtful whether prolapse of vitreous is more frequent in combined than in simple extraction. Bleeding from the iris is only very exceptionally of any importance; when there is much bleeding in cataract extraction the blood is derived from the conjunctival flap or from a too peripheral section. The chief disadvantages of simple extraction are: Risks of prolapse of the iris; less efficient treatment of the anterior capsule; greater difficulty in expression of the nucleus; greater difficulty in removal of soft lens matter; greater danger of ring synechia and secondary glaucoma if iritis should occur.

The chief advantages of combined extraction are: Greater ease in expression of the nucleus; greater ease in removal of soft lens matter; increased facility in dealing with the anterior capsule, and therefore diminished necessity for subsequent discission; diminished risk of prolapse of the iris; diminished risk of secondary glaucoma. The chief disadvantages are: Greater complexity of the operation, including especially need of more instruments and of the introduction of more instruments into the eye, and greater duration of the operation; optical and cosmetic disadvantages; greater danger of incarceration of the iris and capsule in the wound; greater danger of post-operative glaucoma; pain and bleeding from the iris.

The advantages of successful extraction in the capsule are easily stated. The pupil is quite black and no portion of the lens or its capsule remains to give rise to an after-cataract. Further, there is no possibility of complications due to capsule, such as entanglement in the wound, synechia, etc. On the other hand, it cannot be denied that the dangers are relatively enormous. In the hands of most surgeons prolapse of vitreous is of frequent occurrence. This is a most serious accident and any tendency to underestimate it cannot be too strongly deprecated.

It is not only that the immediate effects—delay in healing of the wound, grave liability to infection, etc.—are harmful, but many more insidious remote effects are likely to occur, such as the formation of opacities in the vitreous, detachment of the retina, etc. N. M. B.

A Simple Method of Diagnosis in Paralysis of the Extrinsic Muscles of the Eye.

MACNAB, ANGUS (*Lancet,* June 19, 1909). It is quite unnecessary to insist on the importance to diagnose the affected muscle in a case of diplopia; it is equally unnecessary to point out that the methods generally adopted entail either a very efficient memory or a severe mental effort on the part of the physician making the diagnosis. The almost invariable difficulty which students find in their attempts to decide which muscle is affected seems to show that the methods employed do not allow of the diagnosis being readily and exactly made.

The diagnosis proceeds in stages. (1) Is there a muscle paralyzed? (2) What is its action? (3) Which eye is affected? (4) Which of the muscles having this particular action is affected? By thus proceeding from the general to the particular the possibilities are gradually narrowed down till the final test consists merely in discriminating between two similarly acting muscles.

The only requirement being the elementary one, that the direction, point of insertion and action of each of the muscles should be known.

There are several fallacies which should be avoided if a correct diagnosis is to be arrived at. The eye which obviously deviates from the object fixed is not necessarily the one affected, for the patient may have very good vision in the affected eye, and bad vision in the eye whose muscles are normal; the secondary deviation of the unaffected eye may then be mistaken for the primary deviation of the affected one. In testing the torsional displacement, too, the vertical image is not necessarily due to the unaffected eye. The patient will often say that the colored object (candle) is leaning and the white one is vertical; and then if the colored glass be moved to the other eye the white object is still vertical and the colored sloping. It is quite unnecessary to determine in which way the image slopes, the important point is, in which part of the field is the angle of inclination of the one image to the other greatest?

A muscle is paralyzed when a diplopia occurs in one part of the field of vision or when there is diplopia over the whole field and the separation of the images increases in one direction.

The direction in which the diplopia is greatest indicates the direction of action of the affected muscle.

The image projected further in the direction of greatest diplopia is formed by the affected eye. When the candle is moved in the direction in which the diplopia increases the image which moves most rapidly in that direction is the one formed by the affected eye.

The separation of the images is greatest when the eye is looking along the line of the tendon of the affected muscle or when the object is opposite the end of the affected tendon.

The application of these rules to the various muscle paralyses taken in detail is as follows:

A—Horizontal Diplopia.

1. Increasing towards the right:

    (a) Image formed by the right eye further to the right.
    Right External Rectus.

    (b) Image formed by the left eye to the right.
    Left Internal Rectus.

2. Increasing to the left:

    (c) Image formed by the left eye to the left.
    Left External Rectus.

    (d) Image formed by the right eye to the left.
    Right Internal Rectus.

B—Vertical Diplopia.

Separation Increasing Upwards.

1. Right eye image above:

   An elevator of the right eye affected.

   (e) Vertical separation greater up and to the right than up and to the left.

   Right Superior Rectus.

   (f) Separation greater up and to the left than up and to the right.

   Right Inferior Oblique.

2. Left eye image above:

   An elevator of the left eye affected.

   (g) Separation greater up and to the left than up and to the right.

   Left Superior Rectus.

   (h) Separation greater up and to the right than up and to the left.

   Left Inferior Oblique.

Separation Increasing Downwards:

1. Right eye's image below:

   A depressor of the right eye affected.

   (i- Separation greater down and to the right than down and to the left.

   Right Inferior Rectus.

   (j) Separation greater down and to the left than down and to the right.

   Right Superior Oblique.

2. Left eye's images below:

   A depressor of the left eye affected.

   (k) Separation greater down and to the left than down and to the right.

   Left Inferior Rectus.

   (l) Separation greater down and to the right than down and to the left.

   Left Superior Oblique.

N. M. B.

A Case of Unilateral Optic Neuritis From Intracranial Tumor.

Gowers, Sir Wm. R. (*Lancet*, July 10, 1909). The case reported presented symptoms of an unusual character. There was the common effect and symptom of an intracranial growth, optic neuritis, but it was confined to one eye—which is a very rare event. The author has seen it, but only in cases which differ from this one by recovering and their nature was therefore uncertain.

The pupils acted to light on each side; but on the left the action was not sustained, the contraction was immediately followed by dilatation. The right optic disk was completely hidden beneath a prominent swelling which occupied its position, finely striated, redder in the center than on the sides, down which the vessels sloped. A few lines of very fine dots were seen in the retina beyond the swelling, coursing towards the macula. One or two very mintue hemorrhages were once seen, but they soon disappeared and were not renewed. The veins were not greatly distended. The height of the swelling was found by Mr. Marcus Gunn to be 7 diopters; but 2½ of these were due to hypermetropia, so that the inflamed papilla was scarcely 5 diopters in height, about 1½ millimetres. The field of this eye presented little restriction and she could read 6/6, the acuity being Jaeger 2. It was apparently a neuritis of moderate intensity with little tendency to pass into the stage of "choked disk"; it was a form common in intracranial tumors of slow rate of growth.

A striking contrast to the aspect of the right eye was presented by the left. There was no trace of neuritis present or past, the disk and cup were sharp and clear, the larger vessels of nearly normal size, and the disk presented a greyish rather than a rosy tint, as if atrophy were commencing. A small central scotoma existed for both white and colors, absolute up to 10°. Very dim vision existed around it up to about 30°. With this eye the patient could make out none of Jaeger's test-types. Thus the condition was that with which we are familiar in retro-ocular neuritis.

The tumor was a flattened growth, almost medial in position and extending to each side as you see. It occupied a depression in the under surface of the frontal lobes, corresponding to it in size. The growth was 2 5-8 inches from side to side, 2 1-2 from before back, and 1 5-8 in thickness, which is almost the same in each half. The transverse circumference is about 7 inches. It was smooth in outline but slightly nodulated on the surface, nowhere attached to the brain, but firmly adherent on its under surface in the middle line, where it had apparently sprung from the dura mater over the crista galli, needing a knife for its separation. Its structure was that of an indurated endothelioma.

The tumor lay above the optic nerves compressing them, and it had pressed back the optic chiasma. The left nerve had evidently suffered more compression than the right. There was no distension of the sheath of the left nerve, but moderate distension of the right sheath just behind the eyeball. The left optic nerve had evidently sustained longer and greater compression than the right, and from the pressure the left olfactory nerves had almost disappeared, as might be expected from the complete loss of smell on the left side. The tumor seems to extend back a little further on the right side than on the left, and to this we must ascribe the pressure on the motor path which caused the left sided paresis. No sign can be found, on section, of any growth on the brain.

The author does not think the relief in optic neuritis following trephining (cerebral decompression) justifies the inference that the intracranial pressure is the cause of the neuritis. We find neuritis in cases in which it is difficult to conceive that the pressure has been increased and we find it absent in cases in which the increase must have been considerable. But he thinks we cannot doubt that it is the chief factor in intensifying neuritis and raising it to a degree, which inevitably, if left alone, will lead to loss of sight. The case we have been considering throws no light on the question of the mechanism of neuritis. N. M. B.

On the Treatment and Prognosis of Primary Glaucoma.

Maher, Odillo (*Ophth. Review,* July, 1909). Iridectomy in order to clear the glaucomatous condition, must afford some permanent means of exit for the intraocular fluid, either by reopening the filtration angle or by forming some new channel for drainage. Sclerotomy has but few advocates nowadays, as iridectomy with a scleral section possesses all the advantages of sclerotomy, and at the same time it affords a possibility of re-establishing a communication between the anterior chamber and the canal of

Schlemm. If any advantage is to be derived from iridectomy in chronic glaucoma which has existed for a considerable time, since it is practically impossible to reopen the filtration angle our aim should, in my opinion, be to establish a filtering cicatrix.

For the past thirteen years my aim has been to establish such a citatrix in cases of chronic glaucoma of long standing. I operate in the following manner: Having made the usual scleral section with a broad keratome, I drag on the iris with one or, preferably, two iris forceps—one in each hand—detaching its base at the part corresponding to the scleral section. The loop of iris thus formed is left well prolapsed for a week, when it is snipped off with an iris scissors level with the sclerotic at each angle of the wound. Sometimes I vary the procedure by cutting the iris at the time of the operation at one angle of the wound, and then, by dragging on it with the iris forceps, tear it away from its attachment corresponding to the section, in the hope, if possible, of re-establishing the communication between the anterior chamber and the canal of Schlemm. Instead of now completing the iridectomy, I leave prolapsed, at the other angle of the wound, a large portion of the tag of iris thus formed, and at the end of a week snip it off level with the sclerotic. By this means I generally obtain small flat cystoid cicatrices. The same result may often be obtained, but with less certainty, by performing an iridectomy in the usual way, but cutting the iris so that it is left slightly entangled at one, or both, angles of the section.

Leaving the iris prolapsed for a week before cutting it off causes but little irritation, and ten days after the operation the bandages can usually be dispensed with. In one case, however, plastic iritis set in a few days after the operation, and the eye, which was almost blind, became totally so. Fortunately in this case, I had previously operated successfully on the other eye, and had established a satisfactory filtering scar.

I admit that eyes with cystoid cicatrices run a risk of infection, and that the entanglement of iris no doubt increases the liability to sympathetic ophthalmia.

I would not advocate the formation of a cystoid cicatrix when the operation for chronic glaucoma can be performed early, before the adhesions have taken place at the filtration angle; but when the disease is of old standing, and on account of the firm adhesions between the base of the iris and the adjacent cornea it is no longer possible to reopen the communication between the canal of Schlemm and the anterior chamber, I certainly think our aim should be to establish a cystoid cicatrix." N. M. B.

A New Danger Arising From the Use of Plated Instruments in Ophthalmic Operations.

ROCKLIFFE, W. C. (*Ophth. Review*, July, 1909), reports a case of acute panophthalmitis after cataract extraction, the result of a piece of plating from the De Wecker's scissors used in the extraction finding its way into the anterior chamber. This piece measured 1.5 mm. by 1 mm.

"The explanation is that a fault in the copper-nickel plating in the presence of a saline solution might set up a battery action; this would explain the separation of the plating, and also the subsequent inflammation produced in the eye. He kindly undertook to submit the fragment to an expert Cambridge physicist, who reported 'that he thought that pieces of double metal like this would very much strengthen the electrolytic action, if they got into the saline fluids of the eye, and can quite believe that it would produce much greater inflammation than either metal singly. The strength of the action would depend somewhat upon the E. M. F. of a copper-nickel couple in the salt solution, but even if this were small the fact that the two metals are in actual contact would, of course, produce a comparatively strong current.'"

Some of these scales were submitted to Dr. Crocker of the Southwestern Polytechnic Institute, Chelsia, London, who reports:

"The E. F. M. of nickel and copper electrodes in normal saline solution is 0.02 volts. When the electrodes are placed in perchloride of mercury solution, and the circuit closed, calomel deposits pretty readily on the nickel and mercury on the copper. It seems probable that the effect was primarily due to the action between the couple itself and the organic fluids of the eye, judging by the ease with which the couple corrodes near the surface of the liquid, in air."

The above reports appear fairly conclusive as to the cause of the peeling off of the plating, and of the subsequent acute panophthalmitis, and I am much indebted to these gentlemen for their reports.

In conclusion, I would suggest to all using plated ophthalmic or other instruments to examine the same thoroughly prior to their use, and I much doubt the advisability of ever using such instruments again." N. M. B.

A Case of Retinal Detachment in Pregnancy Associated With Nephritis.

Wilson, Thos. and Hird, R. B. (*Lancet*, July 17, 1909) report a case in patient of 25 years, who in eight months complained of blurred vision and swelling of lids. Vomiting had continued during whole pregnancy, urine had been diminished in quantity for nearly three months and nearly solid with albumen. Failure of vision came on gradually and was 6/60 in each eye unimproved by glasses. There was a large retinal detachment in lower part of vitreous chamber, no signs of retinitis or hemorrhages and disks were normal. One month after induced labor the vision was noticeably improved; visual fields were full and retina in place. V. — O. D. 6/16. V. — 6/12 with correction.

N. M. B.

A Case of Extreme Hypermetropia.

Harman, N. Bishop (*Ophthalmic Review*, August, 1909) describes in detail a case of extreme hypermetropia in a boy of 12 years, the youngest of five children, who possessed 18.50 D. of hypermetropia. His vision was counting fingers at 1 meter; recognized all the common objects about him and distinguished letters when held close to the eyes; muscular movements perfect in all directions; no nystagmus. The range of convergence was extreme; he could fix a point held 5.5 cm. from the level of the cornea; i. e., that is a convergence of about 18 metre angles.

With + 18.00 D. he got 6/36 in each eye.

These lenses could not be worn on account of the length of the eyelashes, so + 15.00 D., the diameter of a shilling (25c piece), were ordered. He now gets 6/24 both eyes.

N. M. B.

ABSTRACTS FROM GERMAN OPHTHALMIC LITERATURE.

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Obstruction of the Central Vein Caused by Lymphocytic Infiltration (Peri- and Mesophlebitis) With Consecutive Retinal Hemorrhages.

SCHULTZ-ZEHDEN, Berlin (*Zeitschrift f. Augenheilk.*, April, 1909, Band XXI, Heft 4). The author states that only one case of obstruction of the retinal vein by disease of the vessel walls has been recorded, namely, by Harms. In the author's case, there was complete obstruction of the central vein caused by a peri- and mesophlebitis, beginning with an infiltration of the perivascular tissues 1 mm. beyond the lamina cribrosa. Anteriorly, the infiltration advanced into the arterial and venous walls. In the lamina cribrosa the infiltration of the adventitia and muscular walls of the vein was so great that the lumen of the vein was completely obstructed. The endothelial wall showed no hypertrophy and no thrombus was visible. As a result of the venous obstruction massive hemorrhages occurred into the retina. F. K.

The Influence of Adrenalin Upon Intraocular Tension.

RUBERT, J., Kiew (*Zeitschrift f. Augenheilk.,* March, 1909, Band XXI, Heft 3). The author, after a series of experiments in eyes of different tensions, concludes that the opinion of certain authors that adrenalin has no effect on the tension of the eye is faulty. Instillations of four to five drops of the 1/1000 solution of adrenalin, or subconjunctival injections of a smaller quantity cause a primary reduction, followed by a marked increase in tension. Subsequently there is a secondary reduction of tension. These changes are observed in normal as well as glaucomatous eyes. The reaction in normal eyes is not very great but in glaucomatous eyes it is quite marked. In normal eyes, the effect of the adrenalin passes away in a few hours, whereas in glaucomatous eyes, the effect continues for several days.

In a certain number of cases of glaucoma the adrenalin produced a lowering of tension, whereas in others, it caused attacks of acute exacerbation. Repeated instillations in normal eyes are apparently without much effect, but in glaucomatous eyes there is a marked increase in tension after the final instillation. The results of the combined use of eserin and adrenalin on tension indicate that two opposing forces are at work. Therefore in eyes that have a predisposition to glaucoma it is advisable to combine eserine with the adrenalin. The changes in intraocular tension are best explained by the action of adrenalin upon the vascular system of the eye. F. K.

Ring Scotoma in Retinitis Pigmentosa.

KRAUSS, W., Marburg (*Zeitschr. f. Augenheilk.,* January, 1909, Band XXI, Heft 1), reported a case of ring scotoma in retinitis pigmentosa which had been observed in the clinic for a period of 30 years.

The patient was a 67-year-old man, in whom there were no indications of lues or tuberculosis. No intermarriage for four generations and no hereditary stigmata could be elicited. The patient had complained of hemeralopia in 1866, and in 1868 depreciation of central vision was noted. In 1870, after typhus fever, the symptoms increased and a ring scotoma was found.

Later, there was a general increase in the size of the ring scotoma, with greatly lowered vision and light sense.

The peculiarity of this case consisted in the fact that the central part of the field was more affected than the peripheral both for vision and colors. The progress of the disease was from the centre to the periphery from the beginning of the process. F. K.

A Case of Pseudoleukemic Orbital Tumor.

Meller, J., Vienna (*Zeitschr. f. Augenheilk.*, January, 1909, Band XXI, Heft 1), reports the further progress of a case presented to the Vienna Ophthalmic Society in 1907. The patient 2 years previously had suffered from influenza, lasting 2 weeks, during which time he was deaf. He recovered his hearing partially. Recently the eyes began to swell, due to a tumor occupying two-thirds of the outer orbital margin, evidently representing the enlarged lacrimal glands. The left eye showed pressure ulceration of the cornea.

The patient presented a general enlargement of the lymph glands, the liver, spleen, etc. The swelling of the lacrimal glands and conjunctiva indicated a lymphosarcoma, but on account of the involvement of the general system, the diagnosis was made of pseudoleukemia with a local aggressive (lymphosarcomatous) manifestation.

Later the patient developed enormous enlargements of all the lymphatic structures, especially of the neck. The tonsil almost completely occluded the pharynx. The left eye was destroyed and replaced by an enormous tumor as large as a big fist.

The patient died Oct. 3, 1908. The post-mortem showed general lymphatic hyperplasia of the pseudoleukemic type, the left orbital growth only having assumed a sarcoma-like growth with its surface ulcerated. Nevertheless this tumor had not broken into the bony walls of the orbit at any point and could readily have been shelled out by operation. The right orbital affection remained in consonance with the pseudoleukemia. Microscopically there was a tremendous lymphomatous infiltration (consisting of small lymphocytes) in the conjunctiva and about the lacrimal glands. The ocular membranes presented no change. F. K.

Bilateral Orbital Phlegmon. Bilateral Thrombosis of the Vena Ophthalmica and of the Cavernous Sinus Following Ethmoidal Empyema.

Gutmann, A., Berlin (*Zeitschr. f. Augenheilk.*, January, 1909, Band XXI, Heft. 1). The patient was a 29-year-old man, who was suffering from roseola specifica following recent syphilitic infection. Two days after an acute attack of coryza and headache, the patient developed great swelling of the lids and orbit with many ecchymoses, and marked exophthalmos. The ophthalmoscope showed congestion of the retinal veins. Normal pupillary reaction was retained.

Gradually the exophthalmos and the hemorrhages increased and intensely acute rhinitis persisted. Symptoms of meningitis developed and the patient died the same night.

The post-mortem section showed basal cerebrospinal meningitis, empyema of the ethmoidal cells and suppurating thrombi in both cavernous sinuses. Heart and lungs were normal. The ophthalmic veins were thrombotic. The author made a microscopic examination of the entire orbital contents and found septic thrombosis of the ophthalmic and retinal veins and of the central retinal artery. The orbital tissues were diffusely infiltrated with small cells, indicating a diffuse phlegmonous process, amounting in places to abcess formation. The author believes that the coryza and headache were accompanied by the infection of previously diseased ethmoidal cells. This infection caused a rapid extension to the orbit through the lamina papyracea, causing a diffuse orbital phlegmon. The place of perforation was indicated on the left eye near the internal rectus by abscess formation. Rapid extension of the purulent process continued along the optic nerve, involving the meninges and the right eye through the circular and the cavernous sinuses. F. K.

Concerning the Operation of the Inner Pole Magnet.

MELLINGER, CARL, Basle (*Zeitschr. f. Augenheilk.*, March, 1909, Band XXI, Heft. 3), takes issue with Schirmer's criticism of the inner pole magnet. He believes that no other magnet is under complete control of the surgeon. The magnetic power can be altered, not only by changing the amount of current passing through it, but also by varying the thickness of the rods of magnetic iron. F. K.

A New Secondary Cataract Instrument.

GOEBEL, CARL, Trier (*Zeitschr. f. Augenheilk.*, March, 1909, Band XXI, Heft. 3), invented a fork-like instrument having two thin, rigid prongs which are 9 to 13 mm. long and separated 1 to 2 mm. These prongs are set in a handle at an angle of 110° to 160°.

This instrument is thrust into the fibrous mass of the secondary cataract from the nasal side, entering the anterior chamber subconjunctivally. A discission knife is entered similarly from the temporal side and is made to cut between the prongs, thus avoiding all traction on the cilliary body. F. K.

Conglomerate Tubercle of the Iris Healed by Means of Bacillus Emulsion—New Tuberculin Koch.

Horniker, F., Trieste (*Zeitschr. f. Augenheilk.*, March, 1909, Band XXI, Heft. 3), believes that enucleation for tuberculous ocular affection should not be performed until tuberculin has been carefully tried.

He reports the case of a seven-year-old girl who had been advised to have her left eye enucleated after four months' effort at cure. The patient had a tuberculous fistula of the tibia and suspicious lung symptoms. The left eye showed photophobia, lacrimation and moderate ciliary injection. The lower half of the anterior chamber was filled with a grayish nodular tumor seated upon the iris and ciliary body. The pupil remained much contracted, notwithstanding free use of atropine, the tumor extending 2 mm. above its upper level.

In spite of mercurial inunctions, the growth four weeks later had extended considerably, filling three-fourths of the anterior chamber. A bluish discoloration over the ciliary body indicated early perforation.

By accident, new bacillus emulsion was received by the author instead of new tuberculin (T. R.), which had been ordered. The seriousness of the ocular condition permitted of no delay. Subcutaneous injections were at once instituted. After three weeks, the miliary tubercles began to disappear and at the end of eight months and after 43 injections had been given, the tumor disappeared and the eye became quiet with a vision of 3/60. There has been no return of the affection up to the present writing. F. K.

Eye Diseases in Japan.

Komoto (*Centralbl. f. prakt. Augenheilk.*, September and October, 1908). From his 20 years' experience of practice in Tokio, where he has examined about 150,000 eye cases, Komoto endeavors to describe the eye diseases most frequently met with in Japan.

I. Lids: Make up 8% of total number of cases. Most frequent is blepharitis, which is quite severe among the indolent farm hands, the mild form occurring in the cities. The scrofulous form is rare. The percentage of blepharitis to other cases, 1.8%.

Trichiasis comes next in frequency. Entropium is more frequent than in Europe, ectropium less so. However, the cicatricial ectropium is frequent on account of burns from open ovens (Jurusi), which are in general use.

Blepharospasm is rarer than in Europe, as scrofular keratoconjunctivitis is not so frequent.

Syphilitic lid affections are found in all forms. Lupus and carcinoma of the lid are extremely rare.

Ptosis is the most frequent congenital defect. Xanthelasma is not rare. He reports one case of congenital elephantiasis of the lid.

II. Lacrimal apparatus: About 1% of cases; chronic dacryocystitis 0.6%. Acute form 0.9%.

Onguci has seen one case of actinomycosis of the nasal duct.

Affections of the lacrimal gland rare. Only one case of acute dacryoadenitis.

III. Conjunctiva: 60 per cent of total number, which is not surprising when it is considered that trachoma is endemic. Pneumococcus and diplobacillus conjunctivitis are not rare. Koch-Weeks, on the contrary, is seldom seen in Tokio, although Misaki reported elsewhere an epidemic in which he found organisms in 80%. Frequent weather changes, wind and dust predispose to infective conjunctival catarrh. Altogether 10 to 12 per cent will cover the various forms excluding trachoma.

Trachoma is a plague of the land due to its chronicity, and the ignorance and habits of the people. The government has called a convention of all the governors to discuss its prevention. Komoto has yearly courses for practitioners on trachoma. Gonorrhoeal ophthalmia about 1%.

Xerophthalmia occurs frequently and is severe, particularly in May and June; however, Komoto remarks they have, in liver, a specific, and results are marvelous.

Vernal catarrh, amyloid and hyaline degeneration, tuberculosis and conjunctivitis papulosa are extremely rare. He has never seen a case of Parinaud's conjunctivitis.

Pterygium is common, almost 1.2%, the relief of which by operation has not been entirely satisfactory with the author.

IV. Cornea, 28%. The percentage is raised by the frequency of pannus (9%) and keratitis parenchymatosa (3.5%).

The latter he believes to be due mostly to syphilis. Ulcus serpens is rare; naturally corneal scars and staphylomata are frequent, requiring frequent operations of tattooing, iridectomy, etc.

Keratitis punctata superficialis is noticeably of frequent occurrence. Compared with Berlin, foreign bodies in the cornea are seldom seen.

Burns from lime, ammonia, lead, saltpeter, iodine, powder, and the like are extremely rare, whereas injuries from arsenic sulphide are often seen, on account of fireworks among the laity.

Sclera: Episcleritis is frequent, rupture rare.

V. Iris, 1%, mostly syphilitic iritis. Plastic chorioiditis much rarer than in Europe. Hyalitis frequent.

VI. Glaucoma is comparatively frequent almost 0.8% ; men to women 10 to 6.

Cataract is probably less frequent (about 3%).

VII. Refraction anomalies show a great difference, which one would expect on account of difference of culture. Myopia occurs in 5% of all eye diseases and hyperopia in 0.3%. Astigmatism, 0.7%.

VIII. Retina: Albuminuric retinitis is frequently seen, especially with contracted kidney, which is a widespread disease in Japan. Retinitis diabetica is rare, as is also detachment.

IX. Optic Nerve: Neuritis and atrophy same as Europe. Has never seen a case of tobacco or alcohol amblyopia. Amblyopia from beriberi (probably rice poisoning) is frequent (0.15% with a bad prognosis in that the scotoma does not disappear).

X. Muscles: Not different from that in Europe.

XI. Orbit: Sarcoma and syphilitic growths seem to be frequent.

Exophthalmus is probably less frequent than in Europe.

M. W.

Further Contribution to the Paraspecific Serum Therapy in Eye Diseases.

Zimmermann, W. (*Die Ophth. Klinik*, November 5, 1908). Zimmermann used the Deutschmann serum in 28 cases, comprising 17 cases of corneal ulcer (for the most part ulcus serpens), 5 cases of ocular traumatism complicated with infection, 3 cases of iritis (gonorrheal, gummatous and traumatic), 2 post-operative infections, and one case of exophthalmos due to sinus disease. The treatment proved efficient except in one case of acute operative infection and three cases of corneal ulcer.

Most of these patients had been treated with atropine, etc., before coming to the clinic. In the clinic the Deutschmann serum alone was employed in the majority of cases, 1500 to 4000 units generally being necessary to effect a cure. In the case of luetic iritis and recurrent gonorrheal iritis the result was most happy.

He recommends 1500 units as an initial dose, this dose to be repeated if necessary on the third day. If after the second dose no improvement follows, the treatment should be discontinued. A. C. S.

Concerning Ulcus Serpens.

Fuchs, Vienna (*Wiener klin. Woch.*, January 7, 1909, No. 1). After a brief resume of the clinical symptoms and pathology of ulcus serpens, Fuchs discusses the incipient stages of the disease and the disease as it occurs in children.

During the past ten years he has made observations in 32 cases of corneal erosion which were followed by ulcus serpens. There was first noted corneal haze about the erosion, and then on the second to fourth day after the injury increasing saturation at the margin of the opacity, a small grey ring thus being formed. This gradually assumed a yellowish color and advanced either concentrically or only in several directions through the cornea. Fuchs previously held McNab's view that there was at first a uniform infiltration from which the ring-shaped opacity resulted after expulsion of the necrotic center. In a series of cases where a uniformly saturated infiltration with hypopyon followed an erosion, no typical ulcus serpens resulted nor were pneumococci ever demonstrated. In the majority of the 32 cases a cure was effected, showing the importance of timely treatment.

He then reports in full the anatomical findings in a case of ulcus serpens of three days' standing, produced experimentally in a human eye about to be enucleated. From these findings he is inclined to explain the pathogenesis of ulcus serpens as follows: The corneal injury, which must include Bowman's membrane, gives entrance to the pneumococci, which bring about circumscribed necrosis and swelling of the corneal tissue. Around the grey necrotic area a white or yellowish zone of infiltration develops. A shallow depression follows the expulsion of the central necrotic area. In the favorable cases the entire infected region sloughs away; in less favorable cases an infected zone of infiltration is left beneath Bowman's membrane, resulting in the progressive margin.

The clinical appearances of ulcus serpens in children are somewhat different from those which characterize the disease in adults; in the diagnosis, therefore, the bacteriological findings are of importance. The disease should not be confounded with deep scrofulous infiltrations.

He reports the histories of nine cases, the pneumococcus being found present in every case. In most of the cases, a history of traumatism was obtainable; in no case was there chronic dacryocystitis.

The typical ring-shaped opacity occurred in only a few cases. As a rule, the infiltration was of a uniform white or yellow color and in a few instances the greatest saturation was at the center. Marked corneal swelling characterized the condition. Fuchs attributes these differences to anatomical conditions. The young cornea when inflamed is apt to undergo excessive swelling. The infiltration at the center is perhaps due to a more rapid emigration of leucocytes from the limbus vessels, to the shorter distance between limbus and site of infection, and to the greater motile properties of the leucocytes in young individuals.

The prognosis of ulcus serpens in children is perhaps slightly worse than in adults. A. C. S.

A Case of Optic Nerve Disease Caused by Injections of Arsazetin.

Reute (*Muench. med. Woch.*, April 6, 1909). The patient a 73-year-old man, received in all six injections of arsazetin for a chronic psoriasis, the dose at each injection being 6 gr., treatment extending over a period of 15 days. Ten days after the last injection the patient commenced to complain of poor vision, and was referred to the Schirmer eye clinic, where a vision of 1/3 was found in O. D., 1/6 in O. S.

Both disks were pale, the retinal arteries narrowed, and the vitreous cloudy. The fields were much contracted. Four days later vision in O. D. 1/6—1/3, O. S. 1/200. The case demonstrates that even arsazetin, a drug considered 4 to 5 times less toxic than atoxyl, may lead to optic atrophy.

A. C. S.

Concerning Idiopathic Epiphora of Nasal Origin.

WELEMINSKY, J., Vienna (*Wiener klin. Woch.*, May 27, 1909). Weleminsky observed that while the application of a sound anywhere to the nasal mucosa generally results in lacrimal secretion, the latter is especially profuse when the anterior end of the middle turbinate is infringed upon, the secretion usually being limited to the same side, but occasionally to both sides. Even where the mucosa on gross inspection appears normal, several dilated vessels in the mucous membrane of the middle turbinate will be found. Cocainization of this region will produce a localized hyperemia of brief duration which appears in marked contrast to the adjacent anemic mucosa.

Weleminsky thinks it probable that these vascular derangements, resulting perhaps from oft repeated irritations, lead to increased reflex irritability of the sensitive nerve endings. Scarification of the anterior end of the middle turbinate has the tendency to diminish this increased reflex irritability and to allay the epiphora.

He reports three cases submitted by the Fuchs clinic in which this treatment was tried. In many of the cases improvement followed after one or two scarifications. (Few of the cases were under observation longer than two weeks.)

In several cases scarification of one side also influenced the epiphora on the opposite side and in some unilateral cases benefit was not achieved until the opposite turbinate had been scarified. In cases where hypertrophies exist he considers the removal of the anterior end of the middle turbinate a more certain therapeutic measure. A. C. S.

Concerning Pel's Ocular Crises and a Few of the Less Common Disturbances of Sensation in Tabes Dorsalis.

KNAUER, Greifswald (*Muench. med. Woch.*, September 15, 1908). The ocular crises first described by Pel and more recently by Determann and Hascovec are among the least common of the tabetic crises. Knauer's case is similar in some respects to the one reported by Pel.

The patient was a 36-year-old female with positive signs of tabes. The ocular crisis characterized itself by sudden, severe, burning pain in the right eye and by conjunctival swelling and injection, lacrimation and photophobia. During the next few days conjunctival swelling increased and there supervened swelling of the periorbital subcutaneous tissue. The pupil was contracted. Excruciating, lancinating, paroxysmal pain in the eye and adjoining temporal region occurred at 15-minute intervals, each attack lasting about 5 minutes, when all pain suddenly disappeared. Marked hyperesthesia of the right lingual and two upper branches of the right trigeminus was also elicited. Vision was normal.

The instillation of homatropine produced a mydriasis, which, however, within two hours' time gave away to pronounced miosis. On the third day the pain suddenly ceased and within the next few days, the eye gradually returned to normal. The other eye became similarly affected 6 days later. (In Pel's patient both eyes were involved simultaneously.) There were no lancinating pains, however, but an uncomfortable sensation of foreign body in the eye associated with photophobia and profuse lacrimation.

Some weeks later another crisis occurred, again starting in the right eye and affecting the left eye the following day.

Photographic copies of the patient during the crisis are contained in the article. A. C. S.

A Case of Sinus Thrombosis and Meningitis Following Croupous Conjunctivitis, With Striking Bacteriological Findings.

Weiss, Vienna (*Wiener klin. Woch.*, November 5, 1908). Weiss describes a case of croupous conjunctivitis in a 13-month-old infant, terminating in thrombosis of the cavernous sinus and pial veins and in a purulent leptomeningitis. Cultures from the conjunctivae, cavernous sinus and meninges produced a bacillus closely resembling the diphtheria bacillus, being non-virulent, however, for guinea pigs. The bacteriological investigations were unfortunately not continued any further and it remained undecided whether a pseudo or an avirulent diphtheria bacillus was in question. The case, nevertheless, teaches that avirulent bacilli of the diphtheria group may play an important part in human pathology. A. C. S.

On the Relationship of Exudative (Phlyctenular) Ocular Affections to Tuberculosis With Experiences Concerning the Value of the Cutaneous and Subcutaneous Tuberculin Diagnostic Tests.

SCHULTZ and VIDEKY, Budapest (*Wiener klin. Woch.*, September 10, 1908). The authors made investigations in 58 cases of exudative ocular disease and give a very complete report of the results obtained. Respecting the phlyctenule they arrive at the following conclusions:

1. To determine the tubercular character of the phlyctenule, the single employment of very small doses of tuberculin (administered cutaneously or subcutaneously) can not be utilized, because they usually do not incite a phlyctenular focus.
2. Recurring inflammations following the introduction of tuberculin may be considered specific reactions when they occur within 5 days or recur on repeating the injections.
3. Phlyctenules are not all of tubercular origin, some being dependent on an exudative diathesis.
4. The discrimination between the two forms is not only of diagnostic, but of therapeutic importance. The tubercular phlyctenule responds more quickly to tuberculin therapy and the two varieties must receive different treatment.

A. C. S.

Resection of the Eyeball.

MUELLER, L., Vienna (*Wiener klin. Woch.*, December 3, 1908). Mueller describes a method of resecting the eyeball which may be employed, he thinks, in the majority of cases requiring enucleation.

The first steps of the operation resemble an optico-ciliary neurotomy. After section of the nerve, the sclera is cut all around and the entire uveal tract and contents removed, leaving behind only the cornea, the anterior portion of the sclera, conjunctiva and attachments of the straight muscles, the tendon of the internal rectus being again united to the globe after resection. The scleral edges may be approximated by sutures, in some cases a celluloid ball introduced.

By this method, the size of the conjunctival sac stays unaltered, a mobile stump remains, less sinking in of the upper lid occurs and a prothesis may be worn several days after the operation. Many patients who refuse enucleation consent to a resection. The operation may be done when there is danger of sympathetic disease and in some cases of staphyloma. In malignant tumors of small size and purulent hyalitis it is indicated only when enucleation is refused. In painful, absolute glaucoma, optico-ciliary neurotomy is to be preferred; even in these cases, however, post-operative complications sometimes necessitate a subsequent resection. A. C. S.

A Rare Location for Echinococcus Disease.

RUDOLPH, M., Brazil (*Muench. med. Woch.*, December 15, 1908). Rudolph reports a case of echinococcus cyst of the orbit in a four-month-old infant. The cyst was somewhat larger than a hen's egg, this size being attained within 16 days. The globe was luxated upward and outward. Exploratory puncture revealed the laminated capsules.

A. C. S.

On Indirect Fractures of the Roof of the Orbit and Projectile-like Action in the Brain of a Bony Fragment.

FISCHER, Cologne (*Muench. med. Woch.*, October 13, 1908). Indirect fractures of the orbit may follow gun shot wounds of the brain, the projectile force being transmitted to the orbital walls. Wounds near the orbit are therefore especially liable to cause fracture of the thin orbital plates. Indirect fractures of the orbital roof may result from the action of a blunt force against the posterior portion of the skull, as occurs in a fall upon the back of the head. A negative pressure in the anterior cranial fossa is thereby induced, which leads to a fracture (often symmetrical) of the thin superior orbital plate, the fragments being, so to speak, sucked into the cranial cavity.

Indirect fractures of the orbital roof may also arise from a sudden increase of intraorbital pressure. He reports the history of a boy who had fallen from his bicycle, severely contusing his right eye. Death ensued within two hours after the accident. Post mortem examination showed a defect in the roof of the right orbit, the corresponding bony fragment being found in the interior of the brain.

The traumatism inflicted resembled a gun shot injury. No other fractures of the skull were found, nor was there any evidence that a foreign body had penetrated. The eye was probably violently driven into the orbit by an object closely fitting over the anterior orbital opening, which permitted no lateral displacement of the globe to occur.

A. C. S.

A Method for the Demonstration of Pigments and Their Colorless Initial Stages With Especial Reference to Ocular and Cutaneous Pigments.

SCHREIBER and SCHNEIDER, Heidelberg (*Muench. med. Woch.*, September 15, 1908). The authors summarize the results obtained by the silver impregnation method of Levaditi and Bertarelli as follows:

1. The chromatophore cells of the iris not only possess pigment—containing protoplasmic processes, but colorless processes which escape observation by the usual methods of examination.
2. The silver impregnation method enables one to follow the developmental stages in the differentiation of the colorless primitive forms of the chromatophore stroma cells from the mesenchyme cells of the uvea.
3. In the albinotic eye, neither in the stroma cells of the uvea, nor in the pigment layer of the retina, is there any evidence of a predisposition to pigment formation.
4. The Ribbert-Schieck hypothesis of the poorly pigmented sarcoma as early stages of melanosarcoma can not be positively verified by this method of examination.
5. The Langerhans cells of the skin are probably unpigmented melanoblasts.
6. The cells of nevus nests show no predisposition to the formation of pigment. A. C. S.

The Significance of the Conjunctival Reaction Based on 4000 Clinical Observations.

WOLFF-EISNER, Berlin (*Muench. med. Woch.*, November 10, 1908). He draws the following conclusions:

1. The subcutaneous and cutaneous reactions are specific reactions to tuberculosis, because each may be induced by latent tuberculosis; however, they are of limited value in clinical diagnosis.
2. The positive conjunctival reaction indicates active tuberculosis.
3. Its occurrence in clinically healthy persons renders the individuals open to suspicion.

4. Its absence in manifest tuberculosis points to an unfavorable prognosis.

5. Negative reactions become more frequent as the disease progresses.

6. From a positive conjunctival reaction, no conclusion can be drawn regarding favorable prognosis, this being only possible from the so-called cutaneous, continuous (dauer) reaction.

7. It is possible to produce receptors in indifferent tissue structures, such as connective tissue which attract tuberculin and localize the toxic action. A. C. S.

A Further Contribution to the Ocular Disturbances Caused by Lightning.

Hessberg, Breslau (*Muench. med. Woch.*, November 9, 1909), reports the histories of three cases. In two of these cataract resulted, in the third, optic neuritis with partial iridoplegia and horizontal nystagmus.

The first two he classifies with the primary contusion cataracts (Praun). The favorable results which usually follow extraction in this variety were also observed in these cases. He concludes by citing similar cases from the literature. A. C. S.

An Influenza Conjunctivitis.

Possek, Gratz, (*Wiener klin. Woch.*, March 11, 1909). The author describes an epidemic of pneumococcic conjunctivitis complicating influenza, his observations beng based on 28 typical cases of influenza occurring during February, March and April, 1908. Only three of the patients were under eighteen years of age.

The conjunctivitis began with swelling of the upper lid and swelling and redness of the tarsal conjunctiva. In most of the cases a more or less marked membrane formation followed, often of rather tough consistency and firmly adherent. A pronounced follicular hypertrophy was also present. There was moderate purulent secretion, the pneumococci being found both in the secretion and in the membrane. In only one case was there a superficial corneal infiltration. The affection lasted about ten days, when a speedy convalescence ensued.

The sputum was not examined for pneumococci; he is unable to say, therefore, whether these were instances of pneumococcic influenza or dependent upon the Pfeiffer bacillus. To his knowledge the coincidence of influenza with a widely distributed pneumococcic conjunctivitis has as yet not been described.

It is possible, as has already been alluded to in a general way by Levierato, that the toxins of influenza increase the virulency of the pneumococcus and make the individual most susceptible to the organism. The transference of the conjunctivitis from patient to patient is thereby facilitated.
A. C. S.

The Endangering of the Cornea by Operative Removal of the Gasserian Ganglion.

Kollner, Berlin (*Muench. med. Woch.*, December 8, 1908). Of the eighteen patients subjected to Gasserian ganglion removal during the past ten years at the Royal Surgical University Clinic, Koellner was able to re-examine nine patients; in three others a report was obtained from the attending physicians.

In ten patients a corneal affection had followed the operation. The recent cases showed a more or less extensive epithelial defect occupying the central portion of the palpebral fissure. In one case infection followed with superficial ulceration and secondary iritis. The complication, as a rule, occurred within the first weeks after the operation. The defect in most cases healed over rapidly and the eye was rarely destroyed. Recurrences were rather frequent.

In the two cases with intact cornea, sensation in the region supplied by the first branch of the fifth nerve was preserved; in the others it was totally lost. In these, too, symptoms of a sympathetic disturbance were present.

Koellner considers the disease not a necrosis, but an epithelial lesion, frequently followed by infection and usually healing over. Section of the fifth nerve does not of itself result in corneal disease; in the majority of these eyes, however, the unavoidable traumatism of daily life soon brings about lesions of the corneal epithelium.

Tuerks' statistics show that of the 47 cases (reported prior to 1902) of total removal of the Gasserian ganglion, 25.5 per cent developed keratitis.

It is therefore advisable in Gasserian ganglion operations to spare the innervation of the cornea as much as possible. How this can best be accomplished must be left to the surgeons.
A. C. S.

A Case of Acute Unilateral Amaurosis Without Apparent Cause, Followed by Optic Atrophy.

ASHER, Leipsic (*Die ophth. Klinik*, December 20, 1908). The writer saw this condition in a 62-year-old woman with hemiplegia. Three days before being consulted there had occurred sudden loss of vision in the left eye with divergence of the globe. The direct light reaction was found absent, the consensual reaction present. In the temporal field there was light perception. The fundus was normal. Examination of the right eye was negative.

There was no history of catarrhal trouble and no pain on moving the eyeball. Asher diagnosed the case as one of hemorrhage into the sheath of the optic nerve between the chiasm and the point of entrance of the retinal vessels. A latent divergence probably pre-existed or the slight retention of light perception in the nasal half stimulated the eye to diverge.

Seven and one-half weeks later divergence was still present, light reaction harldy demonstrable, light perception present in the temporal field. The disk had become pale and atrophic looking. Sinusitis could be excluded.

A. C. S.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

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Ophthalmia of the Newborn.

Bernier (L'Ophtalmia du Nouveau Né, *Gazette des Hopitaux*, May 1, 1909) gives a complete review of the etiology, diagnosis and treatment of ophthalmias in the newborn, which he defines as a group of suppurative inflammations of the conjunctiva, appearing between the first and twelfth day after birth, whose special gravity consists in their tendency to cause blindness by lesions of the cornea. Formerly various kinds of inflammations were grouped under this title, although it was well known clinically that they were not one and the same affection, and the disease was spoken of as a light or severe form, etc. Bacteriological researches, principally by Morax, have permitted the establishment of divisions according to their causes, rather than according to their effects. Of these divisions there are two grand classes; one in which the presence of the gonococcus can be demonstrated, and the other in which it is absent.

In blennorrhagic ophthalmia, the affection appears during the first seven days of life. In certain rare cases, it has been observed at birth. Raymond reports three such cases and Morax has observed two cases of infection in utero, in one of which, the rupture of the membranes had taken place 48 hours before delivery. Long labor and premature rupture of the bag of waters are conditions which favor intrauterine infection. It is possible, however, for the gonococcus to penetrate directly the membrane.

In the morning, the child is unable to open his eyes. The lids are swollen, especially the upper, and upon the edges or in the inner angle, a yellowish or brownish secretion has accumulated. It is necessary now to examine carefully the conjunctiva and cornea. Upon opening the lids, several drops of clear transparent liquid, in which float filaments of mucopus, are seen. After a day or two the fluid becomes frankly purulent and of a green or yellowish gold color. This color is due to the presence of bile pigment, and a drop of the pus will give Gmelin's reaction with nitric acid. The eyes, by this time, are completely closed. The upper lid is very much swollen and bulbar conjunctiva chemotic up to the cornea, so that sometimes in order to examine the case, lid retractors must be used. Great care should be taken in their use, however, not to injure the lid or cornea. Both eyes are ordinarily affected, and a preauricular adenitis is frequent. In variable time, usually from three to six weeks, the secretion diminishes, and the swelling decreases, and unless there have been corneal complications, the eye resumes its natural state.

Ulceration of the cornea is the most frequent complication and can be observed in about one-fourth of the cases. This lesion consists at first of an erosion of the epithelium ordinarily located on the inferior half of the cornea. It appears first as a grayish spot over which the corneal reflex is interrupted and later as a white spot caused by the infiltration of the cornea by drops of pus. Ulceration extends little by little, and deeper and deeper until the corneal tissue is destroyed and the aqueous humor escapes. It is posible, if pressure is exerted, for the lens to escape also at this time. Frequently the iris appears as a black spot in the middle of the whitish zone. The rupture of the cornea may be signal for commencing restitution or the necrosis may extend to the iris and the ciliary body with resulting atrophy of the globe. No matter what the result of the ulceration may be, indelible scars persist. When the scar is slight and in the periphery in time they may partially disappear and a certain vision be retained, but these cases are rare. When the scarring is great and the iris entangled in the scar, distension of the cornea or staphyloma appears. Again if the lesion is in the region with the ciliary body, secondary glaucoma may result. Sometimes the lens is involved with resulting anterior polar cataract, and rarely complications, such as arthritis or general septicemia may occur.

The etiology of blennorrhagic ophthalmia has been definitely known only since the discovery of the gonococcus by Neisser, but Peringer in 1840 showed the possibility of producing a urethral blennorrhagia by contaminating the urethra with pus from the conjunctiva of the newborn. And per contra the pus from the vaginal or urethral mucous membrane may produce a similar affection in the conjunctiva. The maternal origin of ophthalmia blennorrhagica is further verified by the presence of gonorrhea in the majority of mothers whose infants develop ophthalmia.

Ophthalmia of the newborn is ordinarily easily recognized. It must be differentiated from dacryocystitis of the new born in which there is pus between the lids, but no swelling of the latter and in which pressure over the sac causes the appearance of pus in the inner canthus. Keratomalacia is an ulcerative process destroying the cornea, observed in hereditary syphilis. The conjunctival reaction is slight and the disease rarely apappears before the third or fourth week. Infantile glaucoma, in which the cornea presents an opaline or porcelain-like appearance may simulate ulceration of the cornea, but there is no conjunctival secretion. This disease is also a manifestation of hereditary syphilis. Silver catarrh is a conjunctival reaction following the application of nitrate of silver as a prophylactic and is sometimes difficult to differentiate from the true ophthalmia. The differential diagnosis is made by the bacteriological examination which is very easily made by taking up a small particle of pus on a sterile platinum point, spreading on a cover glass and staining. The presence of diplococci frequently intracelllular, and Gram negative makes a diagnosis of gonorrheal catarrh.

Nonblennorrhagic ophthalmias are characterized by the absence of the gonococcus. This essentially makes the diagnosis where from the clinical character one can not always decide. These clinical characters vary. Sometimes there is a light form with a slight swelling of the lids and moderate secretion. Again there may be a form in which there is a false membrane covering the tarsal conjunctiva and also that of the cul-de-sac and this membrane may disappear in 24 hours or may last longer and upon removing it, the conjunctiva underneath appears ulcerated in places. Finally there may be fulminant cases simulating in every way the gonorrheal variety.

The lids are red and enormously swollen and the secretion purulent and profuse, the conjunctiva infiltrated, chemotic and sometimes ulcerated. The cornea is frequently involved, but the lesions are usually superficial, benign, and heal easily. The duration of these cases is always shorter than those of gonorrheal origin. Bacteriological examination discloses not the gonococcus, but various other specific organisms. The diplobacillus is exceptional in the newborn. The bacillus of Weeks is more frequently encountered. Aside from these specific bacilli of the conjunctiva, other organisms are found, such as the bacillus of Pfeiffer, of Loeffler, the colon bacillus, the pneumobacillus. The pneumococcus is undoubtedly the microorganism which causes the greater number of conjunctivites. On the other hand, there are a number of cases in which no microorganism at all can be found.

Morax thinks that these cases in which there is no definite etiology, but in which the secretion shows sterile, are possibly due to an infection of which we have at present no knowledge. Certain eruptive diseases are accompanied by conjunctival manifestations. The conjunctivitis of syphilis, while rarely described is not exceptional.

Prophylaxis.—To Crede is due the honor of having established definitely the scientific treatment of ophthalmias of the newborn, already mentioned by Bischoff in 1875. During the last weeks of pregnancy, one must maintain a rigid vaginal antisepsis by means of injections of permanganate of potash. At the moment of delivery this antisepsis must be still more rigorous and include a thorough washing of the external genitals. Following the delivery and before cutting the cord, the eyes of the infant should be opened and a drop of Crede's solution (nitrate of silver 2%) instilled. Olshausen has shown that the proportion of ophthalmias is diminished more than half when the disinfection is made before cutting the cord. Following the instillation there is sometimes a slight conjunctival injection lasting two or three days, but one never has with the solution the disastrous effects produced by the crayon, which may cause conjunctival scars or even corneal lesions. Other remedies have been used in place of silver nitrate solution. Lemon juice, iodoform and the organic silver compounds have been advocated, but none give the same certain results as the Crede method, and frequently are quite as irritating. Among a total of 1160 infants born at the maternity hospital under the direction of Crede and treated by his method from 1881 to 1883, there were but 40 ophthalmias, or 4/10 of 1%, in place of 11% formerly.

One can judge of the importance of this prophylactic treatment and the necessity for the curative treatment, when one considers the number of ophthalmias. The blind in Europe are estimated at 300,000. If by the application of a rigorous prophylactic treatment, ophthalmia would disappear from Europe, the blind would number only 30,000 or less.

Curative Treatment.—The important part of this treatment consists of the cauterization of the lids once or twice daily, according to the intensity of the conjunctivitis, with a silver nitrate solution, not weaker than 1 to 50, and not stronger than 1 to 30. The simplest method is after having absorbed the purulent secretion with a tampon of cotton to reverse the lids and with a dropper instill several drops of the solution until the cul-de-sac is full and the excess removed with a bit of cotton It is not necessary to neutralize with salt solution. As the secretion diminishes, one diminishes the strength of this solution. In addition to the cauterization, it is necessary to wash out the eyes frequently during the first few days, at least every hour, and in order to remove the secretion, various weak antiseptic solutions may be employed for this purpose. When the cornea is involved, the best treatment is not settled. Some, like Valude, advise immediate secession of the cauterization, while others like Morax continue the cauterization and believe the cornea clears up faster in this way. Sometimes the instillation of methylene blue has a favorable influence also. When the ophthalmias are non-blennorrhagic in origin, cauterization is not necessary and a mild solution of nitrate of silver 1%, or argyrol 20%, or sulphate of zinc 2½%, will bring about a cure. When the conjunctivitis shows the bacillus of Loeffler, anti-diphtheritic serum is indicated. L. W.

Experimental Optic Neuritis and Sympathetic Ophthalmia.

Rollet, E., and Aurand, L., Lyons (Nevritis Optiques et Ophtalmie Sympathique Experimentales, *Revue Générale D'Ophtalmologie*, February 28, 1909, Vol. XXVIII, p. 49). Rollet and Aurand have conducted an elaborate series of experiments upon rabbits with a view to producing artificial optic neuritis and sympathetic ophthalmia. Their methods consisted of the injection into the optic nerve sheath of both cultures and toxines of the pneumococcus, bacillus of Pfeiffer, bacillus of Loeffler, streptococcus, staphylococcus, and bacillus of Koch. The effect of these injections was studied on the living animal and by microscopical section later. They found that all injections, both of cultures and toxines, produced a papillitis with edema and congestion of the optic nerve. The papillitis appeared as early as the third day (pneumococcus), the inflammatory reaction from cultures of the bacilli themselves being much more severe and leaving more permanent effects than injections of the toxines. The bacillus of Koch produced a true tuberculous neuritis going on to beginning atrophy at the time of death of the animal from general pulmonary involvement. The inoculations of the pneumococci and bacillus of Pfeiffer produce optic atrophy in about three months. The bacillus of influenza was shown to be the most virulent and brought on very rapidly a chorio-retino-hyalitis, followed by cataract in one month.

All the microorganisms except the bacillus of Koch provoked a rapid sclerosis of the vessel walls. The sclerosis remained localized and did not extend to the vessels of the retina and chorioid. The neuroglia cells were frequently the seat of a granular degeneration and in some cases an interstitial sclerosis of the nerve was observed. No bacillus and no toxine produced any lesion of the brain or meninges. The bacillus of Koch produced a sympathetic inflammation in the other eye and this was the only bacillus to do so. This bacillus produced a papillitis and a pseudonodular tubercular infiltration in the sheath and nerve, not only on the side injected, but also on the opposite side.

They concluded from their experiments that all the agents employed produce an edema and congestion of the optic nerve, discernible *in vivo*, that in certain cases the edema extended to the retina, and in still others the chorioid and vitreous were involved, that the centripetal propagation, however, is less easily accomplished because no organism produced central lesions. Papillitis is due to the edema and congestion of the nerve itself. This edema and congestion seems to be due primarily to a very rapid increase of the microorganisms themselves in the vessel walls, producing an endo-perivasculitis with rapid sclerosis of the vessels. Infectious neuritis then as well as toxi-neuritis is due primarily to vascular trouble. Action of the toxines, however, is lighter than the action of the bacilli themselves. The production of sympathetic ophthalmia with the bacillus of Koch seems to confirm the migration theory of Deutchmann. L. W.

. Gout and Trauma in Ocular Surgery.

Dauthuile, A., Lille (Goutte et traumatisme en chirurgie oculaire, *Le Nord Médical,* June 1, 1909, Vol. XVI, p. 124), claims that in a patient with gout, an operation can provoke an attack of rheumatism, either in the eye, or, as is usually the case, in the joints or elsewhere. He reports the case of a woman with a gouty history who was operated for cataract. The preliminary iridectomy was followed by rheumatic pains in the right leg, which quickly subsided after the use of sodium salicylate. The extraction was normal, but five hours later, patient had a gouty attack in her right index finger, headache and high fever. Under aspirin the pain rapidly subsided. The next day, the eye was greatly inflamed, pericorneal injection, iris discolored and hyperemia. These symptoms still persisted at the time the article was written, but were less pronounced. C. L.

Lead Shot in the Vitreous; Condensing Hyalitis; Loss of Vision; Clearing Up by Injections of Fibrolysin.

Salva (Grain de plomb dans le vitré; hyalite condensatrice; perte de la vision; éclaircissement par les injections de fibrolysine, Soc. franc. d'Ophtal., Paris, 1909; abs. in *Revue Générale d'Ophtalmology,* May, 1909, Vol. XXVIII., p. 219) had a patient who received a small shot in each eye from the discharge of a pistol. There was loss of vision, and the left eye had to be enucleated on account of a very severe iridoyclitis Radiograms showed the shot still in the right eye, and a substance could be seen with the ophthalmoscope. Vision was reduced to perception of light at 60 cm. Under injections of fibrolysin the vision rose to 2/10 and the vitreous cleared up enough to allow a cicatricial mass to be seen, which surrounded the leaden ball. C. L.

Orbital Trauma and Hemiplegia.

Pechin (Traumatisme orbitaire et hémiplégie alterne. Soc. franc. d'Ophtal., May, 1909; abs. in *Revue Générale d'Ophtal.,* May, 1909, Vol. XXVIII, p. 234) describes the case of a man who was struck in the left orbit by the top of an umbrella. The point passed along the internal wall of the orbit, through the sphenoidal fissure, wounding the motor oculi and Willis's nerve, and cutting the Sylvian artery at its exit from the carotid. There was loss of consciousness, right hemiplegia, paresis of the right inferior facial, diplopia and aphasia.

C. L.

A Neurofibroma of the Orbit Arising From the Frontal Nerve.

VALUDE (Neuro-fibrome de l'orbite, dévelopé aux dépens du nerf frontal, Soc. franc. d'Ophtal., Paris, May, 1909; abst. in *Revue Générale d'Ophtal.*, May, 1909, Vol. XXVIII. p. 232) reports a tumor of the frontal nerve in its orbital portion. Its development was slow, 10 years, and there was neither pain nor inflammation. It extended downward and outward into the orbit 3-4 centimeters. Histologic examination showed that it was a neurofibroma. After the operation there was a zone of cutaneous anesthesia in the frontal and parietal regions.

C. L.

Twenty Cases of Orbital Tumors.

ROLLET (Vingt-deux observations de tumeurs de l'orbite, Soc. franc. d'Ophtal., Paris, May. 1909; abs. in *Revue Générale d'Ophtal.*, May, 1909, Vol. XXVIII., p. 232) reports twenty-two cases seen since his paper in 1907. He divides them into the following groups: (1) Circumscribed, encapsulated tumors (fibromata, mŭcoceles, angiomata cavernosae, carcinomata, sarcomata melanoticae, endotheliomàta); (2) diffuse, malignant tumors (endotheliomata, sarcomata, epitheliomata); (3) osseous tumors of the walls; (4) simple angiomata and aneurisms. If there is exophthalmus without demonstrable tumors, an external incision is indicated, and it is easy to preserve the eye when the tumor is circumscribed and encapsulated. If the tumor lies high up, a superciliary, non-palpebral incision will prevent ptosis. If the tumor is diffuse, a retrobulbar exenteration may sometimes be made which preserves a functionating but immobile eye. Simple angiomata can be cured by radiotherapy.

The Relation of Congenital Buphthalmus to Hemihypertrophy of the Face.

CABANNES (La Buphtalmie Congénital dans ses rapports avec l'hémihypertrophie de la face, Soc. franc. d'Ophtal., Paris, May, 1909; abst. in *Revue Générale d'Ophtal.*, May, 1909, Vol. XXVIII., p. 228) claims that congenital buphthalmus is an overdevelopment of the eye. It is analogous to hypertrophies of the limbs, supernumerary digits, etc. His reasons are that it usually coexists with other congenital anomalies, and that there have been cases reported where no uveal lesion could be found. C. L.

Measurement and Notation of the Visual Field.

Armaignac (Mensuration et Notation du champ visuel, Soc. franc. d'Ophtal., Paris, May, 1909; abst. in *Revue Générale d'Ophtal,* May, 1909, Vol. XXVIII, p. 222) refers to three points: (1) The normal extent of the visual field; (2) the method of measuring it; (3) the method of representing it. The visual field extends about 86° in every meridian from the point of fixation. To obtain the extreme upper or inner limit, the head must be turned in that direction to overcome the shadow of the orbit and nose respectively. It is ordinarily represented on a star whose rays are 30° or less from one another, and these are cut by circles 10° distant from each other. The author measures only the four principal meridians, which he represents by its initial, *i. e.*, E. S. I. I. A field of vision by his notation would be for example O, D, E, S, I. I=90, 70, 50, 60, or more simply=9756. If more meridians are desired they too, can be expressed by one number, *e. g.*, O. S, E. S, I, I=898,776, 655,567.

C. L.

The Spontaneous Cure of Hypermetropic Astigmatism.

Lagrange (De la Guérison spontanée de l'astigmie hypermétropique, Soc. franc. d'Ophtal., Paris, May, 1909; abs. in *Revue Générale d'Ophtal.*, May, 1909, Vol. XXVIII, p. 222). Since the form of the cornea is always changing, one form of astigmatism may change into the other. This is especially true of those eyes where the error of refraction is not corrected. In view of this fact, the correction of astigmatism in the young should be done with great judgment. The spherical correction should be moderate, and the cylindrical should be made only when there is evident demand. C. L.

A New Theory of the Pathogenesis of Nystagmus.

Sauvineau (Nouvelle théorie pathogénique du nystagmus, Soc. franc. d'Ophtal., Paris, 1909; abs. in *Revue Générale d'Ophtal.*, May, 1909, Vol. XXVIII, p. 222) has found from his investigations that nystagmus and associated paralysis of laterality are two clinical forms of lesions of the supranuclear center presiding over laterality. Nystagmus is a convulsive phenomenon due to irritation of this center. If the lesion is at the same time destructive, it may be complicated with paralysis of the associated movements, or may even be replaced by the latter. C. L.

Operation for Traumatic Cataracts, Especially Those Due to Occupation.

Bourgeois (L'Opération des Cataractes traumatiques, spécialement dans les Accidents due Travail, Soc. franc. d'Ophtal., Paris, 1909; abst. in *Revue Générale d'Ophtalmologie*, May, 1909, Vol. XXVIII, p. 218). Since spontaneous resorption of a cataract takes a long time, it is the duty of the physician to aid nature by operating. In persons over 40 years, the typical operation for senile cataract is done one month after the injury. In younger patients a simple, linear extraction is made. For this a broad needle giving a corneal section of 3 millimeters is used and a long, narrow silver curette, with a fine groove, which automatically aspirates the soft cataract. It may be necessary to use three or four curettes of different size. In three months, the patient is able to return to work.
C. L.

Sporotrichosis of the Visual Apparatus.

Morax (La Sporothrichose de l'Appareil Visuel, Soc. franc. d'Ophtal., Paris, May, 1909; abst. in *Revue Générale d'Ophtalmologie*, May, 1909, Vol. XXVIII, p. 208) has observed two cases. They were characterized by follicular lesions acompanied by ill-defined yellowish spots, painful sensations and a very pronounced adenopathy. Diagnosis is easy by culture of the scrapings of the conjunctiva. Iodide of potassium internally with cauterization locally gives good results. The etiology is still obscure, for it is necessary to determine under what conditions the sporotrix, normally always present, may pass the barrier presented by the epithelial cells. C. L.

A Form of Hereditary Family Keratitis.

Jacqueau (Une Forme de Keratite Héréditaire et Familiale, Congrés de la Soc. franc. d'Ophtal., Paris, May, 1909; abst. in *Revue Générale d'Ophtalmol.*, May, 1909, Vol. XXVIII, p.

198) reports the family history of eight persons who presented the same corneal affection at the same age. Both eyes were involved, and the lesion consisted of the presence in the superficial layers of the parenchyma of a delicate network of greyish lines intersecting in many places, where fine nodules were formed. There was little or no inflammatory reaction. Dionin in maximal doses every three days gave the best results, but no case was cured. C. L.

Keratoconus.

Parisotti (Kératocone, Rapport a la Soc. franc. d'Ophtalm., Paris, May, 1909; abs. in *Revue Générale d'Ophtal.*, May, 1909, Vol. XXVIII, p. 198) thinks that keratoconus is due to congenital lack of resistance in the central part of the cornea, which is thus unable to withstand even a normal intraocular tension. It is probably the elastic tissue of the cornea which is at fault. In the early stages of the condition, the patients should wear glasses best adapted to the refraction. Myotics, especially pilocarpine, and a pressure bandage may be used. If it continues to progress, one may try paracentesis, sclerotomy and incision at the base of the cone. If the progress is very rapid, or the patient is first seen when the condition is far advanced, cauterizing of the apex of the cone with the galvanocautery is indicated, followed later by an iridectomy for optical purposes. Fine work should be avoided by the patient. C. L.

Basedow's Disease and Sodium Salicylate.

Lavrand (Maladie de Basedow et Salicylate de Soude, *Journal de Sc. Méd. de Lille*, January 9, 1909; abst. in *Rev. Générale d'Ophtalmologie*, April, 1909, Vol. XXVIII, p. 187) reports two cases of Basedow's disease which were treated by sodium salicylate. The amount given was 2 grams a day, and the result was a decided amelioration of the condition. C. L.

Surgery of Cancer Assisted by Fulguration.

Juge (Chirurgie du Cancer Appuyée par la Fulguration, *Marseille Médical*, January 15, 1909; abst. in *Revue Générale d'Ophtalmologie*, April, 1909, Vol. XXVIII., p. 187) gives in detail a method which aids rather than supplants the surgical operation of cancer, and reports forty cases, one of the face and orbit. C. L.

Ocular Paralysis in the Course of Scarletina.

Terrien (Paralysies Oculaires au cours de la Scarletina, *Journal de Médicine:* abst. in *Revue Générale d'Ophtalmologie,* March 31, 1909) demonstrated before the Société de Pédiatrie a child of three years, who two years before, during a mild attack of scarlet fever suffered from a paralysis of the left internal rectus and divergent strabismus. The latter had almost disappeared, but there was still diplopia and paresis of the muscle. It was probably a case of peripheral neuritis, which perhaps are more common than it is supposed. C. L.

Indications and Contraindications for the Operation on Chorioidal Cataracts.

Beaujeu (Indications et Contre-indications de l'operation de la Cataracte Choroidienne, These de Paris, 1908; abst. in *Revue Générale d'Ophtalmologie,* April 30, 1909) means by this term those cataracts directly or indirectly dependant on lesions of the uvea. They are operable under the following conditions: If there is a good central and peripheral light projection, if the tension is normal, if the eye is not irritated, and if the conjunctiva does not show numerous vessels, which latter indicates a defective intraocular circulation. A preliminary iridectomy is frequently advisable to favor maturation, break up anterior adhesions and test the susceptibility of the eye to operative procedures. Operation is often possible in hypermature, capsulo-lenticular, regressive and Morgagnian cataracts, and good results may be obtained. It is always necessary to take into consideration the effect of the chorioidal disease on the vitreous. C. L.

A Case of Bitemporal Hemianopsia.

Stanculeanu, G., Bucharest (Sur un Cas d'Hémianopsie Bitemporale, *Archives d'Ophtalmologie,* May, 1909, Vol. XXIX., p. 305), reports a case in a girl of 18 years. The trouble began about a month before with diminution of sight in the right eye and severe headaches. Patient was emaciated and in addition to the headaches, suffered from nausea and vomiting. Pupils reacted to accommodation, but not to light the disks were discolored, with an atrophic aspect. The field of vision showed a very large bitemporal defect. Under mercury the condition gradually improved, and the fields became larger though the last one shown in the text shows a decided contraction. Radiographic examination of the head showed an exostosis of the sphenoid at the sella tursica pressing on the chiasm. C. L.

Concomitant Lesions of the Eye in Epidemic Cerebrospinal Meningitis.

TERRIEN, F., and BOURDIER, Paris (Les Troubles Oculaires Immédiats dans l'Epidémie Actuelle de Méningite Cérebro-Spinale, *Archives d'Ophtalmologie*, May, 1909, Vol. XXIX., p. 301) divide these lesions as follows, basing their conclusions on cases observed in their hospital practice:

(1) Conjunctivitis; the bacteria were always polymorphic (staphylococcus, pneumococcus, Week's bacillus) but the predominating form was an intracellular diplococcus, Gram-negative.

(2) Cornea; ulcers—2 cases.

(3) Intrinsic muscles; mydriasis 24 cases, miosis 5 cases, Argyll-Robertson pupil 1 case.

(4) Extrinsic muscles; paralysis right externus—unilateral 5 cases, bilateral 1 case, paralysis of convergence 2 cases.

(5) Neuroretinitic lesions; papillitis 16 cases, hyperemia of disk 7 cases, neuroretinitis 3 cases, normal 16 cases. Papillitis occurred anywhere from the 4th to the 20th day. C. L.

Phlyctenulosis Conjunctivae Viewed as a Toxi-Tuberculide.

WEEKERS, L., Liege (L'Exanthéme de la Conjonctivite Phlycténulaire Envisagé comme une Toxi-Tuberculide, *Archives d'Ophtalmologie*, May, 1909, Vol. XXIX., p. 294), says that among the different causes assigned to phlyctenulosis, that of scrophulosis stands preeminent. Having had considerable work in dermatology, he has been struck with the similarity between phlyctenulae and certain toxi-tuberculides of the skin. By the latter he means lesions of the skin of a tubercular character, which do not contain the bacillus, and cannot be used for inoculation (lichen scrofulosorum, etc.). They are probably caused by the toxines formed at the bacillary focus and carried by the circulation to distant parts of the body. The author tested 58 children of less than 15 years, who had typical phlyctenulosis, using v. Pirquet's test, and found a positive reaction 51 times; 7 times it was doubtful or negative. From other sources he finds the relation between tuberculosis and phlyctenulosis well established; e. g., the positive result of the ophthalmo-reaction, the presence of polynuclear leucocytes, epthelioid and giant cells. Then, too, the author has observed phlyctenulae and tuberculides in the same child. For the above reasons, he seems justified in regarding the phlyctenula as a toxic-tuberculide. C. L.

Traumatic Avulsion of the Eyeball and Optic Nerve.

CHEVALLEREAU, A., and LIEGARD (Arrachement Traumatique du Globe de l'Oeil et du Nerf Optique, *Archives d'Ophtalmologie*, May, 1909, Vol. XXIX., p. 289) reports the following case: A man in falling struck his left eye on a chair, causing its avulsion so that it literally hung on his cheek. He did not present himself for treatment, however, until the third day. When seen, the eye was hanging down over his cheek, suspended by the optic nerve. When the globe was replaced in the orbit, in as near its exact position as possible, the patient was able to move it to the right normally. When he attempted to look to the left, or downward, the globe was rotated outwards. The patient had no pain, and his general condition was perfect. Enucleation was performed by simply cutting the muscles and conjunctiva which remained attached. The length of the optic nerve was 28 mm. C. L.

Central and Paracentral Corneal Leucoma and Certain Other Ocular Lesions in Their Relation to Visual Acuity and Ability to Work.

BAUDRY, S., (Du Leucome Cornéen Central et Paracentral et de Quelques Autres Lésions Oculaires Dans Leurs Rapports Avec l'Acuité Visuelle et l'Aptitude au Travail, *Archives d'Ophtalmologie*, May, 1909, Vol. XXIX., p. 273), reports a series of cases of corneal lesions as well as other conditions following trauma, the tendency of which is to lower the visual acuity of the affected eye. He finds that the gravity of the loss is in a large measure dependant on the patient's occupation, in as much as certain fields of work require a greater degree of sight. C. L.

Two Cases of Microphthalmus Accompanying Hydrocephalus.

ROCHON-DUVIGNEAUD, A., and COUTELA, C. (Deux Cas de Microphtalmie chez des Hydrocéphales, *Archives d'Ophtalmologie*, May, 1909, Vol. XXIX., p. 257), give the very interesting histories of two cases. In the first case the left eye was very much smaller than the right. The latter, at the age of 5 months, was slightly larger than the average for the newborn, whereas the left eye was distinctly smaller in all diameters. There was also a slight nystagmus. In the other case the right eye (age 16 months) was smaller than that of the new born, while the left eye was even smaller than the right. The four eyes showed the different stages from retinochorioiditis to atrophy of the globe, and could be used to demonstrate the different steps. While no cause can be given for the existence of the two conditions in the first child, paternal tuberculosis might explain it in the second. C. L.

Adrenalin; a Test for Lesions of the Ocular Sympathetic.

GAUTRELET, J., Bordeaux, (L'Adrénaline, Réactif des Lésions du Sympathique Oculaire, *Archives d'Ophtalmologie*, April, 1909, Vol. XXIX., p. 222) reviews the experiments by which it has been shown that if adrenalin is injected intravenously into the lower animals, a high degree of mydriasis is obtained. If, however, adrenalin is dropped into the conjunctival sac, no reaction occurs unless the superior cervical ganglion has previously been removed, when a high degree of mydriasis follows. In man, instillation of adrenalin likewise produces no pupillary reaction, unless there is a lesion of the sympathetic, as a case rèported by the author shows. His patient's throat had been accidentally cut, following which was a severe hemorrhage and an almost complete aphonia, the latter persisting for several days. This was followed by a hoarseness which could be explained by a paralysis of the left vocal cord, and a certain anesthesia of the pharyngeal mucosa. The left eye seemed smaller, but the patient said it was becoming larger. There was also a slight ptosis and miosis of the left eye. No fundal changes. It was evidently a case of lesion of the pneumogastric, with a lesion of the sympathetic. The latter was confirmed by dropping 3 drops of adrenalin (1-1000) in the left eye. In 5 minutes there was a slight dilation of the pupil, which persisted when the patient looked at the sun; 15 minutes later, 2 drops more were instilled. The mydriasis became very pronounced and persisted until the patient went home. A control test of the other eye produced no dilation of the pupil.

C. L.

Radium in Ocular Therapeutics.

DARIER (Le radium en thérapeutique oculaire, *La Clinique Ophtalmologique,* May 10, 1909, Vol. XV., p. 217) supplements his papers published in this same journal in 1904 and 1905. Time has proved the correctness of the views which he expressed at that time. Following the example of Paris, King Edward VII. has accepted the patronage of the newly founded Radium Institute of London, where 5 grams of pure radium are placed at the disposal of the medical public. The Paris institute has been in existence three years, and a society is now being formed to rent to practitioners all radioactive apparatus.

Darier, with his modest apparatus has had excellent results in the treatment of neoplasms, as well as in the cure of neuralgias and facial palsies. Radium is preferable to X-rays in treating small neoplasms of the eyelids, as the effect can be localized with much greater precision. The high-frequency current is of great value in completing the treatment.

If the action of radium is kept within certain limits the normal tissue is not influenced, the changes being confined to irregular tissue, such as pathological or neoplastic products.

The first important factor to determine is the efficiency of the apparatus used, which presents some difficulty. What is sold as radium is seldom pure. The practitioner should experiment on himself first, exposing his forearm to the apparatus for 5, 10 and 15 minutes, and taking exact notice of the intensity and duration of the redness. The least activity which will influence neoplasms is one which produces a redness of the skin 5 or 6 days after an exposure of 20 minutes. This activity would be shown by an apparatus containing 5 milligrams of radium of 500,000 uranies spread as a varnish over a disc one-quarter centimeter square. A milligram of pure radium of 2,000,000 uranies would have about the same activity, as the glass absorbs a great part of the rays.

In ocular therapeutics the apparatus used should be of such a form as to permit of easy application to the conjunctiva and the conjunctival folds, as it is frequently used in the treatment of trachoma and vernal catarrh. An apparatus ending in a glass ball the size of a pea, and covered with a varnish containing 5 milligrams of radium of 1,000,000 units would best answer this purpose and the exposures would not have to be of long duration.

Radium may be considered a specific in the treatment of the small skin epitheliomas of the eyelids and face; a few exposures cause the nodes to melt away and the ulcerations to cicatrize with hardly any scar. The danger of recurrence is always near, however, and the treatment must be thorough to prevent it. The greater the radioactivity of the apparatus the longer the intervals between the exposures. The larger the affected surface, the greater the number of exposures. All the affected parts must be exposed over the same length of time. To treat a chancroid 1 centimeter square four exposures of 15 minutes should be made at a distance of 1-4 centimeter, the whole sitting thus taking one hour. The sittings should be given twice a week at first, and then once only. After a month's treatment a month is allowed to pass without treatment in order to note results Should there be glandular involvement the high-frequency current should be used. In severe cases surgical encheiresis may precede both kinds of treatment named above.

Cheloid scars and the infiltrated scars resulting from the excision of chalazia are, almost without exception, greatly benefited by several applications of radium. The small spots in lupus are also very favorably influenced by radium, but it would be wearisome to treat an extensive lupus in this way, so that this form of treatment would be reserved for the small spots which encroach on the palpebral margins. Syphilitic lupus is removed by a few applications of radium.

The hard chancre of the eyelid yields more quickly to radium than to any other form of treatment, and the remaining scar is soft and hardly visible.

Owing to the characteristic changes produced in the capillaries by radium this mode of treatment has been used to cause their disappearance when they are not too thick or too extensive. A chalazion of the size of a grain of wheat will disappear in 3 to 5 weeks after two or three exposures of 15 to 20 minutes have been made to the cutaneous surface of the lid. A slight recurrent redness of the lid is the only evidence of the treatment.

In regard to the treatment of trachoma with radium Darier's experience has been very limited owing to the dearth of material in Paris. He reviews the results of those who had fresh material at hand, such as Kardo-Syssoyeff and Selenkowski, and draws the following conclusions: Radium is highly efficacious in the treatment of trachoma both in the cases where there is a diffuse infiltration as well as in the cases which show discreet granulations.

The infiltration of the conjunctiva yields to the treatment even in the most rebellious cases. The pannus of the cornea may show an exacerbation after the exposure to radium, and disappears later on. In three weeks the granulations disappear without leaving any scars. The secretion rapidly diminishes.

The first effects show themselves on the fourth day. The granulations which persist the longest are those in the upper fornix of the conjunctiva and in the region of the caruncle. The results obtained by radium are permanent. The exposures should be made twice a week, each exposure lasting five to ten minutes. More frequent exposures are irritating, as the effect of the radium is cumulative. Temporary falling of the cilia sometimes occurs. The radium is contained in a curved tube which has been flattened to adapt itself to the conjunctival surface.

In chronic trachoma, at the beginning of the stage of cicatrization and formation of pannus the effect of radium is not as efficacious, yet it will cause the granulations to disappear and the pannus to clear up. The exposures must be made at long intervals in this stage, as frequent exposures would give rise to irritation. One to three months of radium treatment will, however, give better results in this stage than a year's treatment by any other method.

The analgesic properties of radium are especially pronounced in fresh pannus.

After all the follicles and diffuse infiltration have disappeared the mucosa should be subjected to one or two further exposures. The edema of the conjunctiva which sometimes persists disappears without special treatment. For catarrhal conditions the astringents will be found of service.

Radium should not be allowed to act directly on the globe, as it has a noxious effect on the deep structures of the eye and on the cornea.

The treatment with radium being painless it can be readily used in children and timid subjects. M. W. F.

The Magnet With an Internal Pole.

Mellinger, Carl, Basle (L'Aimant a Pole Interne, *Archives d'Ophtalmologie*, April, 1909, Vol. XXIX., p. 193) states that the ordinary giant magnet, used for extracting foreign bodies from the eye, has the fault that the lines of force emanating from one pole of the magnet have a tendency to reach the other pole very rapidly and thus a large number of them fail to act on the foreign body. The result is that the latter is only feebly magnetized, and this is inversely as to the distance of the object from the magnet. To compensate for this the size of the magnet must be increased, at the expense of the ease with which it is manipulated. The author had an annular magnet constructed, but found that this form also attained a very great size before it was useful.

Accordingly, he had a solenoid constructed of a size sufficient to allow the head to be inserted into it. As the solenoid has the power of forming within it a homogenous magnetic field, the particle of iron in the eye is strongly magnetized. Now, if a bar of iron is introduced into the magnetic field close to the eye, it also becomes strongly magnetized, and being firmly held in the hand, while the intraocular, magnetized iron is more or less movable, it exerts a pull upon the latter whose force depends on the diameter of the iron bar. Thus by changing the bars or by increasing or diminishing the current passing through the solenoid, the operator is able to exert as much of a pull on the intraocular body as he wishes.

In 36 cases of attempted magnet extraction of foreign bodies by the above method, all except two were successful. In one, the foreign body was retrobulbar, in the other, it was embedded in the ciliary body. C. L.

Contribution to the Pathologic Anatomy and Pathogenesis of Cysts of the Palpebral Lacrimal Gland.

Weekers, L., Liege (Contribution a l'Anatomo-Pathologie et a la Pathogénie des Kystes de la Glande Lacrymale Palpébrale, *Archives d'Ophtalmologie*, April, 1909, Vol. XXIX., p. 203), reviews the previous literature and gives the details of a case of his own. In a boy of eight years old, a tumor had appeared in the external canthus about three months before, had grown progressively, but had remained stationary for three weeks. It was now the size of a small hazelnut. The tumor was removed, under local anesthesia, in toto together with a portion of the gland, which was readily recognized. Microscopical examination showed that it was a large unilocular cyst, into which opened several other small cystic cavities. Its wall was composed of fibrous tissue, infiltrated in places with embryonal cells, and covered on the side of the cavity with an epithelium composed of a single layer of cells. Those were squamous in the region of the acini, but cylindrical or prismatic elsewhere. The ducts of the gland empty into the cyst, but they have undergone profound changes. The ducts are dilated. The epithelium is variable in number of layers, and the cavity is filled with a coagulum similar to that which fills the cyst proper.

The glandular epithelium which covers the membrana propria of the acini is composed of a single layer of slightly granular cells, whose oval nuclei usually lie at the base of the cell.

The condition probably starts as an infection. There is a proliferation of the cells near the conjunctival orifice of the gland which cause an obstruction and retention of the gland secretions. C. L.

Involuntary Movements of the Lid Associated With Those of the Jaw and the Face.

Cantonet, A., Paris (Mouvements Involuntaries d'Elevation Palpébrale Associés a ceux de la Machoire et de la Face, *Archives d'Ophtalmologie*, April, 1909, Vol. XXIX., p. 216) reports such a case in a man of 24 years of age. Following the extraction of a tooth he presented a very marked ptosis, diplopia and perhaps facial paralysis on the left side. At the same time the associated movements appeared, for although voluntary lifting of the lid was impossible, it was raised whenever he masticated. Examination showed the right eye normal, but there was a slight paresis of the left inferior oblique. The left upper lid was in a state of ptosis, but on moving the jaw the lid was raised until 2 mm. of the sclera was visible.

There are five possible combinations: (1) There may be a voluntary movement of the lid. This is the exception. (2) The movements of the globe may be normal. This is usually the case. (3) The movements may be associated with those of muscles controlled by the trifacial. This is the usual condition. (4) The movements may be associated with those of muscles supplied by the facial. (5) The movements may be associated with those of muscles supplied by the trifacial or by the facial. C. L.

Acoin; Its Incompatibilities; Its Use as an Analgesic in Subconjunctival and Intramuscular Injections.

Brunetiere, Bordeaux (L'acoine; ses incompatibilities; son metode d'emploi comme analgésique dans les injections sous-conjonctivales et intra-musculaires; *La Clinique Ophtalmologique*, July 10, 1909, vol. XV., p. 326). Acoin was introduced by Trolldenier in Dresden in 1899, and its merits in ocular therapeutics so well demonstrated by Darier, that many oculists soon added it to their armamentarium. In the ten years it has been in use no serious accident has been noted, but Brunetiére thinks that its use would be more extended if its mode of action were better understood.

Much less toxic than cocain, its analgesic action is somewhat less in use, but much more prolonged than that of cocain. The addition of cocain to liquids injected under the skin makes the injection painless for half an hour; the addition of acoin produces an analgesia of several hours, although the analgesia is a little slower in establishing itself. A 1% solution of acoin, according to Darier and Spindler, is the best to use, although the strength of the solution may be varied with the concentration and the causticity of the liquid injected.

The precautions to be taken in using acoin are:

(1) The solutions should always be freshly prepared with cold water which has been recently distilled. The solutions should be kept in the dark in colored bottles, and in this way may be kept days, or even weeks. A trace of alkali is sufficient to cause a precipitate, so that Darier advises rinsing the containers with nitric acid followed by boiled water. Age seems to cause deterioration in the solutions, so that Brunetiere does not use the solutions placed on the market in globules but always makes his fresh solutions with acoin tablets.

(2) Acoin should never be mixed with certain drugs, especially not with the salts of mercury, as this produces a precipitate, probably a double salt. This precipitate blocks the lumen of the needle and changes the chemical action of the liquid. Amongst the solutions generally used for subconjunctival injections, 1% solution of lithium benzoate gives a light precipitate, 2% benzoate of mercury a very heavy, thick precipitate; 1% watery solution of biniodide of mercury a heavy precipitate which appears at once; chloride of sodium, 2 to 20%, a precipitate which appears slowly, and is heavy in proportion to the density of the solution; 1% to 1/1000 cyanide of

mercury no apparent reaction; 5% iodide of potash acts the same as a similar solution of sodium chloride; 1% to 1/1000 sublimate a heavy, white precipitate; 1-10 oily solution of biniodide, no change. In order to avoid this mixing of incompatibles Brunetiere advises that two glass syringes fitting the same needle be used. Two to five drops of the 1% acoin solution are first injected; after waiting a minute or two the other syringe containing the second fluid is screwed onto the needle and the injection completed. Thus the seat of the injection is rendered anesthetic and the precipitation prevented. While acoin does not make the injection positively painless, it does diminish the pain to such an extent that in nine out of ten cases it will be possible to employ this so very efficient method of treating inflammations of the anterior part of the eye.

Oily solutions of acoin were introduced in ocular therapeutics by Pflueck. They are made with the acoin base. The chlorhydrate is the form in which acoin appears generally in commerce, and this, like the alkaloids of morphine, cocaine, eserine, etc., is very soluble in water, but very little in oil. The effect of these oily solutions is much more lasting than that of the watery solutions. M. W. F.

Iodoform Amblyopia.

SAUVINEAU (Amblyopie iodoformique, *La Clinique Ophtalmologique*, July, 1909, Vol. XV., p. 345). Referring to a case of Rochon-Duvigneau, in which amblyopia with central scotoma was produced by the injection of a suspension of iodoform in glycerin into a cold abscess, Sauvineau reports a similar case. A railway fireman had been injured about the legs in an accident, his injuries consisting mostly in burns of the third degree, which were dressed with iodoform powder. About two months and a half later the vision began to fail, and in a few days had sunk very much and so remained until Sauvineau saw him five months after the accident, when he could count fingers with either eye at 18 inches. In both eyes there was a central scotoma for white, but the peripheral field was intact. In both eyes there was a light suffusion of the optic disks. Inunctions of mercury, potassium iodide internally, and the constant current were used. A fortnight later the vision had improved to 1-4, but there was inversion of the fields for colors, a condition which has been considered characteristic of hysteria. The perception of green was so poor that no field for that color could be taken. With the exception of a light suffusion of the disk of the right eye down and out, the fundus presented a normal appearance. Continuing the same treatment the vision rose in six weeks to normal, and the chromatic troubles disappeared. Ten years later his condition was still good.

Comparing the two cases, Sauvineau remarks the slow onset of the visual trouble, the great disturbance of perception for green, the lesser for red, and least of all for blue. There was in both cases optic neuritis, very well marked in Rochon-Duvigneau's case, but only indicated in Sauvineau's. In distinction from other similar cases described, in which the end result was atrophy of the optic nerve, we have here two cases in which there was a restitutio ad integrum, which persisted for ten or fifteen years. The prognosis of this class of optic neuritis is, therefore, not as bad as usually believed. Nevertheless, these cases should warn the surgeons against using iodoform in massive doses. M. W. F.

Note on the Pathogenesis and Treatment of Keratoconus.

Terson, M. A. (Note sur la pathogénie du keratocone, *La Clinique Ophtalmologique*, July, 1909, Vol. XV., p. 341) believes that keratoconus is a condition *sui generis,* a central atrophy of the laminated corneal tissue due to neurotrophic softening. While the peripheral parts of the cornea are not normal the central changes are greatest because that part of the cornea is farthest from the blood supply, exposed most to external influences, and at the point of greatest strain from muscular and lid action. Whereas Hutchinson's keratitis and certain severe forms of scleritis may produce keratoglobus, they never produce keratoconus. The latter is, therefore, not a disease, but an expression of local weakness. The treatment should be largely hygienic, tonic and by means of correcting lenses. Strong concave cylinders, concave spherical lenses, contact glasses and the hydrodiascope should be tried systematically. A light bandage of knitted goods has often done good in the beginning, but Terson has abandoned the miotics in favor of atropin. An iridectomy seems at times to stay the process, and Terson thinks the resection of one of the corneal lips of the iridectomy wound is a logical procedure, the value of which will be determined in time. As a last resort electrocautery may be tried, but Terson has seen a case in which silver nitrate had been used according to the Sichel-Graefe method, in which he thought the resultant leucomata were less disfiguring and the solidity of the tissue greater than they would have been after the use of the cautery. Blepharorrhapy gives an ideal pressure bandage, which is always well borne, and prevents corneal breaking down, but it cannot always be made use of. M. W. F.

Sclerectomy With Vacher's Instrument.

Dor, Louis, Lyon (La sclerérectomie a l'emporte-piece, *La Clinique Ophtalmologique,* July, 1909, Vol. XV., p. 321). The punch, originally intended by its author for the operation of secondary cataract, can, according to Dor, be advantageously used in the performance of anterior and posterior sclerectomy. It has the advantage over the knife or scissors generally used to perform posterior choroido-sclerectomy, that any resultant hemorrhage finds an easy vent, and, besides, the pressure exerted by the instrument acts as a hemostatic. The amount of tissue removed can be more accurately determined, and one can, if he wishes, avoid wounding the chorioid by pushing the male branch of the punch through an incision made in the sclera with a Graefe knife, and pushing the chorioid back. The treatment of the subsequent hernia of the chorioid is left to the judgment of the operator. Having done this simple posterior sclerectomy on animals only, Dor cannot speak as to its antiglaucomatous value.

The value of the posterior chorioido-sclerectomy was well proved to Dor in a case of subacute glaucoma with obliteration of the anterior chamber, the other eye having been previously lost from the same cause in spite of a large iridectomy. A fortnight after the posterior chorioido-sclerectomy the anterior chamber had become re-established, the pain and congestion had left the eye, and it was possible to satisfactorily do an anterior sclerectomy and iridectomy, which had become necessary, as the tension had begun to rise again, and the anterior chamber once more to grow shallow. The tension remained normal thereafter, and the vision sufficient to enable the patient to go about, better vision being prevented by lenticular opacities. Even with the Vacher punch the posterior sclerectomy is merely a preparatory operation, but the instrument is to be recommended on account of the facility with which it enables one to do the operation with lesser danger of hemorrhage and of injury to the vitreous.

The anterior sclerectomy has the advantage of producing permanent results, but in order to attain these a permanent subconjunctival fistula must be established. If one uses Vacher's instrument the incision with Graefe's knife can be placed more centrally, thus avoiding the danger of wounding the ciliary body, as one can attain the desired result by biting a piece from the posterior lip of the wound. Here are the steps of the operation as practiced by Dor:

The incision is made with the Graefe knife, no attempt being made to leave a bridge in the sclera.

A conjunctival flap is cut and turned back on the cornea.

The punch is introduced so as to bite the posterior lip of the wound; the male branch is pushed into the irido-corneal angle.

About this time a small hernia of the iris appears, and is resected after cocain has been applied. The conjunctival flap is then replaced, and even sutured, if one desires. This procedure gives a permanent fistula. M. W. F.

ABSTRACTS FROM ITALIAN OPHTHALMIC LITERATURE.

BY

V. L. RAIA, M. D.

PROVIDENCE, R. I.

Ocular Affections in Relation to the Lymphatics and the General Constitution.

SAMPERI, GAETANO (*Archivio Di Ottalmologia*, January, February, March, 1909.) Acording to the author the external irritants, lacrimation, disturbances of refraction are the occasional causes in the production of ciliary blepharitis, predisposition and lowered general constitution being the true factors of this affection. The disposition of the lymphatic vessels and the abundance of these in the lids render the margins easily accessible to irritative substances which are carried in the lymph from neighboring organs affected by some external disease (eczema of the forehead, of the scalp, etc.). Without the poor constitution and the affected vitality of the tissues the toxins circulating in the lymph would remain innoxious and no inflammation of the lid margins would appear. Consequently a rational treatment to be effective must first be directed to the improvement of the general system with appropriate tonics, the local remedies only then manifesting their efficacy. Phlyctenular conjunctivitis has been the subject of many studies and discussions. Some consider it the manifestation of scrofula, others of tuberculosis, while many others attribute its development to different germs making their way through the epithelium of the conjuntiva from the surface of the same. The author is opposed to any idea of endogenous infection, it being incomprehensible how germs circulating in the blood could affect only the conjunctiva and give no manifestations of their presence in the blood with any kind of reaction, as it is observed in other infectious diseases. Dr. Samperi is inclined to consider the affection of exogenous origin, with an hereditary predisposition.

The most recent studies which have also been proved by the researches of the author in several microscopical sections confirm the fact that the phlyctenulae which have been considered in the past as true vesicles, are nothing else than the result of a cellular infiltration with elevation of the epithelium of the conjunctiva.

Parenchymatous keratitis was considered by the old writers as the consequence of general cachexia, until Hutchinson put it in relation to syphilis. This theory found at its very beginning its partisans and opponents. Later researches showed that the affection can be traced to lymphatism, scrofula, tuberculosis, rheumatism, influenza, disturbances of menstruation and even traumatism. Dr. Samperi reproduced experimentally interstitial keratitis by injecting in the anterior chamber of rabbits diphtheria antitoxin, and other substances. He thinks that the root of the evil is in the lowered conditions of the body, which constitutes a real predisposition. In these conditions of the body, toxins circulating in the blood and reaching the anterior chamber of the eye are capable of producing a true interstitial keratitis, without any alteration of continuity of Descemet's membrane. According to the author, syphilis is the most frequent cause, then come tuberculosis, scrofula, etc. Parenchymatous keratitis arising during the menstrual periods he explains by admitting the presence in the blood of special toxins which, getting in the aqueous, and from this into the stroma of the cornea, produce a regular inflammation of this membrane.

V. L. R.

Diffuse Arterio-Sclerosis With Chorioidal Atrophy of Syphilitic Origin.

GIULIANETTI, L. (*Archivio Di Ottalmologia,* February, 1909) reports a case of arteriosclerosis of the chorioidal vessels in a man of 47 years old with acquired syphilis. Fifteen years before, one of the eyes had been affected by an iritis which had left the sight somewhat impaired; two months previous to his first visit the other began to fail. At the time of the first consultation vision was found diminished in both eyes, but more in one than in the other. The ophthalmoscopic examination revealed four big white patches at the posterior pole of the eye, in which the chorioidal vessels appeared like white and tortuous ribbons without any trace of blood in the center. Besides these alterations there were also at the periphery spots of chorioidal atrophy. Symptoms of arteriosclerosis were evident in the other arteries of the body, so that no doubt remained about the nature of the chorioidal alterations. Other cases of the same nature have been reported by different writers, but the author regards his own case as the only one that can be put in relation to a specific infection. In syphilis producing alterations of the inner vessels of the eye, these are always limited to the retinal vessels and never as a rule to the chorioidal.

V. L. R.

Bilateral Atrophy of the Optic Nerves and Malformation of the Skull.

PALTRACCA, ERNESTO, (*Archivio Di Ottalmologia*, March, 1909). Michel was the first in 1873 who spoke of the coexistence of cranial deformities and affections of the optic nerve. Many other cases have been reported since then, the authors giving a different explanation of the pathogenesis of the eye affections. Some think that the optic neuritis which gives as a final result atrophy of the disks is due to a regular meningitis, others think that intracranial increased pressure caused by the premature closure of the biparietal and other cranial sutures is to blame, while others attribute it to thickening of the optic foramen. In Dr. Giulianetti's case the temporal and the occipital regions were very protuberant, this deformity, according to the parents, having developed two years after birth when the sight also became blurred. Evidences of syphilitic infection were manifest in the family, and the author, discarding all other theories, believes that this specific infection is at the bottom of the optic nerve affection. It is well known that syphilis produces alterations of the bones of the body and of the skull especially, so that we may say that cranial deformities and atrophy of the optic nerves are dependent upon the same cause, syphilis. The mother during her pregnancy contracted that dreaded disease called pellagra, which, according to the studies of Agostini, in 1902, and to previous ones of Ceni, capable alone of producing cranial deformities. Consequently pellagra may be in our case an important factor of these alterations. V. L. R.

Contribution to the Study of Persistent Hyaloid Tissues—Their Classification and Origin.

CALDERARO (*Clinica Oculistica*, April, May, 1909). Since the discovery of the ophthalmoscope by Helmholtz many cases have been reported of persistent hyaloid artery or remains of hyaloid artery The author has had the opportunity to examine microscopically few cases, a very rare thing, considering the difficulties of obtaining eyes with these anomalies. With this material at his disposal and a careful study of the literature on the subject he has proposed a new classification, dividing the anomalies in six groups. His article is very exhaustive and well put up, and we attempt to give only an idea of this important work, touching briefly on the principal points.

While the old classification distinguished two groups, persistent hyaloid artery and Cloquet's canal, the author speaks: 1st, of hyaloid filaments; 2nd, prepapillary plugs; 3rd, canal of Cloquet; 4th, remains of hyaloid tissues; 5th, true hyaloid vessels and persistent hyaloid artery; 6th, eccentric hyaloid remains. The most frequent of all these anomalies is the first one, the filaments running from the bifurcation of the central artery of the retina in the papilla to the posterior part of the lens, where it may divide in several others running to the periphery of the lens or to the ciliary body. The less frequent are the remains of true hyaloid artery, which nevertheless have been reported. The canal of Cloquet when present appears at the ophthalmoscopic observation as a canal with thin and transparent walls floating in the vitreous and attached to the papilla and posterior surface of the lens. Within are found connective tissues which are the remains of the hyaloid artery.

These anomalies are not constituted by tissues which had to disappear, but neoplastic connective tissues which have taken the place of embryonic ones of inflammatory nature and assuming the form of this latter. They are true cicatricial tissues formed around embryonic tissues which have disappeared. That this is the case can be proved by the microscopic examinations made by the author. V. L. R.

Jequiritine in the Treatment of Epithelioma of the Lids.

Denti (*Annali Di Ottalmologia,* Anno XXXVIII., Fasc., 4). The author has reported several cases of epithelioma of the lids which had resisted other methods of treatment cured completely by the use of jequiritine, according to the directions given by Rampoldi. He has used the discs and the liquid form of jequiritine, scraping, before their application, the surface of the tumor, to render more efficacious the action of the drug. He does not advise subcutaneous injections, thinking them rather dangerous.

Jequiritine, according to Denti, is perfectly safe, it acts on the neoplastic cells only, sparing the sound tissues, and stimulates the substitution of normal elements to pathologic ones. In one case specially, the reproduction of a normal lid was so perfect that the most accurate examination could not distinguish it from the other, which never had been affected by disease. In this case the whole lower lid was affected, so much that at the first visit the patient had been told that only an extensive plastic operation with the excision of the whole lid could save the neighboring tissues from further infiltration. The application of jequiritine was resorted to only as an experiment, without the least idea of success. Against all expectations the neoformation was quickly thrown off and in its place normal skin appeared, so that after some time the lid could hardly be distinguished from the other of the sound side.

In the same number of the *Annali Di Ottalmologia* Dr. Mario Farina writes an article "On the Action of Jequirity in Some Cases of Cancer," highly extolling this method of treatment above all others. He thinks also that the drug has a special elective action for the pathologic neoformation for which it greatly differs from Röntgen rays, these latter not only destroying the cancerous cells but also the sound tissues.

As numerous reports from important clinics of Italy have appeared lately, all lauding this new departure in the treatment of epithelioma, it would be worth while, before resorting to surgical and radical measures, to try this innoxious remedy.

V. L. R.

SOCIETY PROCEEDINGS.

SECTION ON OPHTHALMOLOGY.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Meeting, April 15, 1909. Dr. Wm. Zentmayer, Chairman, presiding.

Chronic Dacryocystitis.

A case of Retinitis Punctata Albescens in a negro, who showed the characteristic white spots, with pigment overlying a large trunk of a bloodvessel, scotomata similar to those frequently found in beginning retinitis pigmentosa, and hemeralopia, was reported by Dr. Swindells. He thought the presence and disposition of the pigment formed a connecting link between this disease and the ordinary forms of retinitis pigmentosa. In this connection several writers were quoted who had seen retinitis punctata albescens and retinitis pigmentosa in the same family. Comment was also made that this was probably the first case of retinitis pigmentosa, if this classification could also be permitted, reported in a negro, though correspondence with some Southern ophthalmologists proved that a few cases had been seen.

Dr. Posey said that as well as he could remember this was the first case of retinitis pigmentosa he had ever seen in a negro. He said retinitis pigmentosa, for he thought that there was no doubt but that retinitis punctata albescens, so-called retinitis pigmentosa without pigmentation, and retinitis pigmentosa were all the same disease, dependent upon the same cause, and the result of the same pathological process, but with different ophthalmoscopic pictures, depending upon the nature of the changes which had occurred in the innermost layers of the chorioid and pigment layer of the retina. He thought the case under discussion was peculiarly interesting, as the presence of the splotches of pigment on the retinal vessels, though few in number, served to indicate the connection of retinitis albescens with retinitis pigmentosa. He had seen one other case of retinitis albescens in a woman years ago, where the continuous employment of electricity locally and the employment of all manner of general remedial measures had failed to make the slightest impression upon the course of the disease. He remarked that as yet no adequate and complete study had been made of the diseases to which negroes were liable, and suggested that this would be an excellent field for some American ophthalmologist.

Chronic Dacryocytitis.

Dr. Wm. Campbell Posey exhibited a boy, aged nine years, in whom he had recently removed the lacrimal sac on account of a Chronic Dacryocystitis. The canaliculus had been slit up and the duct repeatedly probed by another surgeon for more than a year without beneficial result. Healing was prompt after the removal of the sac by Meller's method, the line of incision was almost invisible, and the conjunctiva, which had been the seat of a chronic inflammation, had rapidly cleared after the irritation occasioned by the bacteria contained in the sac had been removed. In answer to a query as to his practice in the treatment of lacrimal disorders, Dr. Posey said that if a case came to him complaining merely of epiphora, he syringed the passages with a mild astringent lotion, and if the fluid passed into the nose, he repeated the procedure once a week for several weeks. If, at the end of this time, the epiphora continued, the patient was etherized and a lead style introduced, which was worn for three months or longer, according to the peculiar circumstances connected with the case. If after the removal of the style the epiphora still continued, he removed the sac by Meller's method. He had relinquished the use of probes for several years. He considered success in the removal of the sac to reside in the injection of novocaine and adrenalin locally, as by this means a practically bloodless field of operation is obtained, without which the removal of the sac in toto was practically impossible.

Dr. Zentmayer said that some operators of large experience in this operation had called attention to the fact that it was more diffiuclt to do in children, and that the results had not been as perfect as when performed on adults.

Kroenlein Operation for Orbital Growth.

Dr. Posey also exhibited a woman of advanced years from whom he had recently removed a tumor from the orbit, by means of the Kroenlein procedure. Healing had been prompt and the line of incision occasioned but little deformity. Dr. Posey thought this operation should be used more frequently, both for diagnostic purposes as well as for the removal of growths.

Atrophy of the Iris.

Dr. Goldberg reported a case of unusual Atrophy of the Iris, occurring a year or more after a severe injury, in which the chorioidiae had been ruptured. The atrophy was not preceded by the usual inflammations and exudations, but began as small points of pigment, which had the appearance of lying on the surface of the stroma, distinct from the retinal pigment layer, as when exposed by atrophy. He believed these to be due to a proliferation of the cells of the retinal pigment layer which were reaching up through the fibers of the stroma to bud upon the surface. This condition was followed by profound atrophy, beginning at the point of pigmentation and spreading, as was the case in one eye, to large proportions, the clumps of pigment finally suffering in the degeneration.

Dr. Posey said that in addition to atrophy of the iris from disease, thinning, or an actual absence of some of the tissues of the iris, was sometimes seen as a consequence of congenital malformations, and cited a case which he had reported some years before, where the stroma of the iris was wanting in what might be viewed as a partial colobomatous area to the nasal side of an otherwise healthy eye. He referred to the theory which he had advanced at that time, that anomalies of the iris are the result of an anomalous distribution of the vascular supply of the iris, as a consequence of some obstacles presented to the protrusion of the embryonal iris tissue between the lens and the cornea.

Dr. Howard F. Hansell stated that he believed that pigment and structural alterations in the iris following traumatic rupture of the chorioid might be the result of degeneration of the entire uveal coat, which had its starting point in the severance of the chorioidal vessels in and adjacent to the area of ruptured chorioid. They are, he believed, nutritional changes, basing his opinion on the presence of vitreous opacities—not those appearing immediately and dependent upon hemorrhages into the vitreous—opacification of the lens, and finally the absorption of the pigment and stroma from small areas in the iris. Such he assumed to be the cause of the morbid changes in a patient under his observation. The patient's head was caught between two heavy timbers in a railroad wreck. He complained of partial loss of vision in the right eye. The first abnormality noticed was double chorioidal rupture, to be followed in the next two years by floating vitreous opacities, cortical cataract, and atrophic patches in the iris, through which the fundus reflex could be seen.

In reference to Dr. Hansell's remarks, Dr. Goldberg concurred with him, and believed that the condition of the iris was the result of the changes which were taking place in the chorioid, and was not of local origin, as the nature of the injury might easily have indicated. This would explain the independent character of the late changes which had not been preceded by the usual causes.

Ocular Symptoms Simulating Those of Exophthalmic Goitre.

Dr. Zentmayer presented a patient, aged sixty-nine years, with Ocular Symptoms Simulating those of Exophthalmic Goitre without any systemic indications of that affection. The Dalrymple sign was the most marked, and the Graefe sign was only manifested when the fixing object was carried downward from above the horizontal plane. Stellwag's sign was very pronounced and convergence was weak. Dr. Zentmayer said that while any one of these symptoms, especially Graefe's, has been observed in healthy individuals, it was extremely rare to have almost the entire symptom complex present.

Parenchymatous Keratitis in Acquired Syphilis.

Dr. Burton Chance reported a case of Parenchymatous Keratitis in Acquired Syphilis, which he had noted in a young married woman. It was evidently the first serious disease of the eye the patient had had. There were no signs of any dyscrasia nor of previous inflammation, and the disease had come on insidiously without marked symptoms and was confined to one eye. At first the cornea contained a number of grayish punctate opacities, scattered through the parenchyma, which later became more numerous in the centre and shortly were formed in a solid sheet, so that the cornea became quite opaque. There was but scant vascularity of the cornea, and but little lacrimation and pain. In nine weeks from the commencement of the attack the cornea regained sufficient transparency to afford a satisfactory examination of the fundus, where, except for dense iritic adhesions to the lens, the interior of the eye was apparently healthy; and the patient discontinued visiting the hospital.

As in Collins' case, the cornea in this one became ulcerated; and in keeping with the details in certain of the reported cases, there were ulcerations in the nasal and laryngeal cavities. There was distinct iritis at the start, but at no time were there evidences of involvement of the chorioid in either eye.

It was impossible to obtain a satisfactory or even trustworthy history of syphilitic infection. The patient was most intelligent, and she declared she had been in perfect health up to the birth of her child. It may be assumed, therefore, that the infection had taken place within two years prior to the outbreak in the cornea.

So prompt was the recovery after the administration of mercury that our faith in the "therapeutic test" was allowed to rule us in assuming it to be a genuine case of syphilitic infection.

Dr. Hansell stated that there seemed to be no doubt that interstitial keratitis, presenting all the features of the parenchymatous keratitis of inherited syphilis, is occasionally met with. The numerous articles in the journals in the past few years bear abundant evidence of the existence of the disease. His experience led him to believe that it was not the principal affection, but was secondary to disease of the uveal coat, particularly of the iris and ciliary body. It differs from the inherited form in that the exudation into the anterior chamber is more profuse, the thickening and discoloration of the iris greater, and the posterior synechiae denser and more numerous. In other words, the keratitis is not a separate affection, but only a complication of iridocyclitis.

Dr. Zentmayer fully agreed with what Dr. Hansell had said. He recalled several instances where the interstitial deposition in cases of iridocyclitis had been so marked that it was difficult to distinguish it from that of interstitial keratitis. But his impression is that in this type there is a greater tendency to the formation of blebs. He said that Krueckmann had recently called attention to corneal involvement, in connection with syphilitic iritis, and its clinical resemblance to interstitial keratitis, the explanation given being that the spirochetae were present in the deposit on Descemet's membrane, and that their entrance into the cornea excited a syphilitic inflammation in the deeper layers of that membrane.

Dr. Chance, in closing, said he was quite willing to accept the judgment of Dr. Hansell, for his conception of the disease under discussion is that it is an iridokeratitis rather than a pure keratitis, such as is found in congenital infection. And so he laid stress in his description in this case. The patient had been studied nine years ago, at which time few of his teachers believed the cornea could be affected in acquired syphilis. The records had been kept for all these years, and as the recent reviews of Carpenter and Davis had settled the question, Chance felt that he was justified in presenting his case under the title assumed.

Calcareous Lens.

Dr. Chance exhibited a large, perfectly whole, and well-formed calcareous lens which he had taken from a shrunken globe. The surfaces were eburnated and were free from capsular remnants. The lens was contained in a capsule composed of thin iris and a densely fibrous membrane posteriorly. The aged patient said that for many years there had been a sensation as though a hard object were floating in the eye; and it is quite probable that the lens could have been loose in this sac.

Dr. Chance exhibited another lens, presented by a colleague. This was a case of greater clinical importance. The eye had been damaged by a blow from a ball. Twelve years later the fellow eye was lost by traumatic iridocyclitis. After this hardened lens was looped out, the eye was found to be healthy, and the patient has had useful sight for several years.

Dr. A. C. Snell (by invitation) said that recently he had operated on a man, aged sixty years, who had received an injury to his right eye thirty years previously. The left eye had had recurrent attacks of inflammation, and at the time he came under his observation the vision was reduced to perception of moving objects. The vision had been about as bad as this for seventeen years. Dr. Snell had obtained from him the history that at the time of the injury three oculists had advised an enucleation, but the patient feared an operation and would not consent; that the right eye (the injured one) was blind from the time of the injury; that the left eye had never given him any trouble and vision was perfect for about ten years, when through recurrent attacks it also became practically blind; during the attacks both eyes were simultaneously inflamed.

The case was believed to be one of sympathetic inflammation, the pupil of the sympathizing eye being filled with a slightly yellowish lymph exudate.

The operation consisted in a preliminary iridectomy and later removal of the lens, with a satisfactory result.

The injured eye was enucleated and was found to contain a calcareous lens. In the position of the ciliary body a complete ring of bony deposit existed. The question Dr. Snell wished to ask Dr. Chance was: "In this case does it not seem possible that the bony deposit in the ciliary region was the real exciting factor in causing the sympathetic inflammation?"

Dr. Goldberg remarked that he had seen the specimen from which Dr. Chance's calcareous lens had been taken, and that a curious feature of the condition was the absence of calcareous material in other parts of the eyeball, it appearing to be confined entirely to the lens.

T. B. Holloway, M. D., Clerk.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Meeting of March 8, 1909. Dr. Frank Allport, President, in the Chair.

SYMPOSIUM ON SYPHILIS.

Extraocular Syphilis.

Dr. Casey Wood read a paper on Syphilis of the External Eye. He drew attention to luetic affections of the lacrimal gland, which he regards as rare.

Chancre of the lid is readily confused with suppurating chalazion and even with an acute purulent dacryocystitis. Gumma of the eyelid is another rare disease. Lues of the conjunctiva includes mucous patches, gumma, chancre and other syphilides.

Although the older ophthalmologists believe the sclera to be immune from attacks of syphilis we know this contention to be unfounded, although sclerotic alterations due to lues are rare and prone to be regarded as nonspecific or as tubercular.

Tarsitis syphilitica is rather uncommon, although the diagnosis, by modern means, is easily possible.

The lacrimal apparatus often suffers—especially in conjunction with nasal duct obstruction, the result of periosteal and bony disease—the luetic origin of which is always to be suspected.

By far the most common luetic disease of the external eye, mostly due to congenital infection, is interstitial or parenchymatous keratitis. Probably 75 per cent of the cases are due to hereditary syphilis. Dr. Wood entered fully into a consideration of its treatment and believes that hygienic measures—outdoor life, tonics, etc., are of more importance in the general conduct of the case than specific remedies.

The Diagnosis of Syphilitic Eye Lesions by Means of the Spirochaete Pallida and the Serum Reaction of Wasserman.

Dr. B. C. Corbus read a paper on this subject.

With the discovery of the spirochaete came its demonstration with the staining methods, which at first was more or less successful in skilled hands, but the demand for a simpler and more reliable method, led Richert, the instrument maker of Vienna, to reintroduce the dark ground illuminator. Here we have a method which is extremely simple, the technique of which can be mastered by the average physician.

During the past 18 months Dr. Harris and Dr. Corbus have examined some two hundred cases. These have been confined to primary lesions on the penis, hands and lips and secondary lesions, comprising condylomata, mucous patches, papules and enlarged inguinal glands.

Numerous English and American ophthalmologists lay considerable stress on the fact that the spirochaete are found in apparently healthy eyes of fetuses and infants who have died from congenital syphilis. This is not at all surprising when we realize that the fetal circulation is fairly alive with the organisms and that they are easily demonstrated in every organ, particularly in those organs where there is an abundant blood supply, as, for example, the chorioid coat of the eye.

From the preceding we would be led to presume that primary and secondary lesions of the eye are extremely rare. This in a measure is true, but it is highly probable that these conditions have been overlooked on account of insufficient means for diagnosis.

With the aid of the dark ground illuminator, we have a rapid, reliable and simple method of differentiating these ulcers and as a further means of diagnosing syphilitic eye lesions we have the serum test of Wasserman, Neisser and Bruck.

Whether the limitations of this test extend beyond the mere diagnosis and permits us to judge in some degree of the effectiveness of a cure, time alone will tell. The tendency of the modern treatment of syphilis is toward a biologic treatment, that is, to control the treatment with the Wasserman reaction. Of one thing we are positive, that the Wasserman reaction gives us control of the diagnosis after the period of second incubation, no matter what length of time has elapsed, provided the patient is not cured.

Unfortunately the Wasserman reaction is complicated. It requires time, patience and careful work and each series of tests must be controlled by known normal and syphilitic sera. Statistics in regard to the value of this reaction are now available in large numbers and there seems to be no branch of medicine or surgery that is not benefited by this discovery.

Dr. Corbus and Dr. Harris concluded:

1. That spirochaete pallida are present in all syphilitic lesions, including those of the eye.

2. In chancres and mucous patches, the diagnosis should be made by the demonstration of the spirochaete.

3. All other lesions of the eye of syphilitic origin may be diagnosed by means of the Wasserman test.

4. Eye conditions depending upon pathological changes in the nervous system of syphilitic origin may be diagnosed by the Wasserman test.

5. All doubtful cases that might be explained on a syphilitic basis should be given the Wasserman test.

Dr. Corbus and Dr. Harris explained in detail the Wasserman test and demonstrated the living spirochaete before the society.

Intraocular Syphilis.

Dr. William H. Wilder read a paper on the above subject, an abstract of the principal points being as follows:

Syphilis is the cause of from one per cent. to three per cent. of all eye diseases. By far the largest number of all syphilitic lesions of the eyeball are of the intraocular structures.

The iris and ciliary body are more frequently affected by syphilis than any other part of the eye. Syphilitic iritis usually manifest itself as a plastic inflammation. It affects one eye in the majority of cases, but one-foruth of them are bilateral. The appearance of the disease in the second eye may be considerably delayed, sometimes for a year. With the exception of the papular or condylomatous form, separately considered, there are no marked distinguishing features that speak for the specific etiology of the disease and one must rely upon the history and other manifestations of syphilis to determine the exact nature of the process. Iritis, condylomatous or papulosa, is supposed to be characteristic of syphilis. One, sometimes two or more, grayish yellow or reddish brown nodules appear on the papillary margin of the iris, and at this site there is usually a posterior synechia. About 8 per cent. of cases of syphilitic iritis present this feature.

There has been considerable discussion as to the nature of these nodules, some regarding them as condylomata and others as true gummata. When appearing in the secondary stage, as they usually do, it is probably nearer the truth to call them condylomata. True gumma of the iris may form in the later stage of the disease. It frequently affects the root of the iris, but more frequently pushes forward from the ciliary body. The disease usually appears at the time of the syphilids, about six months after the initial lesion, but it may appear before or be delayed for a year or more. The course is much like that of an ordinary case of iritis, but on the whole the prognosis is rather more grave. Especially true is this of the condylomatous and gummatous forms, for many of these eyes are lost because of the severity of the inflammation. Except when the papular form is present, which is rather characteristic, one cannot be sure of the syphilitic nature of a given case of iritis. The distinct history of hard chancre and the presence of syphilids and other luetic manifestations make the diagnosis reasonably certain. However, in the majority of cases the clinical evidences are not sufficient to enable us to distinguish the syphilitic from other forms of iritis, and this is even more true of cyclitic, chorioiditis, retinitis and optic neuritis.

The spirochaete pallida has been found in the aqueous humor by some observers, and this test might be made use of for differentiation. The recent reports on the value of serum diagnosis developed by Wasserman and Plaut from the principle of complement fixation, hold out the hope that a method has been discovered that will be of great value to the ophthalmologist in determining the exact nature of certain obscure lesions of the eye.

Chorioiditis frequently occurs as a complication of iridocyclitis. There is no clinical appearance that is distinctly characteristic of syphilis in any of the lesions of chorioid or retina with possibly the exception of diffuse chorio-retinitis.

Acute irido-chorioiditis manifests itself by an increase of the evidences of inflammation in a case of iritis. The vision is reduced and the tension lowered. Numerous opacities in the vitreous make it impossible to see the fundus. The prognosis is grave, for the retina may become detached and the eyeball may shrink.

Treatment of Syphilis.

Dr. W. L. Baum presented this feature of the subject.

Dr. Thomas L. Dagg stated that the diagnosis of syphilis by means of laboratory methods has become popular by reason of its accuracy, although as stated by Dr. Corbus, the technic is beset by many difficulties. The spirochaete can be demonstrated in the lesions, thus making the diagnosis absolute, but the staining methods are far from being satisfactory. The

Spiegel condenser method is satisfactory when the spirochaete is present, but is of no value whatever in a negative way. The Wasserman reaction is valuable when positive results are obtained, but the test is beset with difficulties. The use of the organ extract is liable to be made difficult because of the age of the extract: therefore, Dr. Dagg and his co-workers are now investigating the method of Noguchi, who employs lecithin as an antigen, and he uses human blood as well as the hemolytic inactivated serum prepared from human blood. This simplifies the method not only for the biological laboratory, but also for the general practitioner. The method is still in its infancy, but Noguchi's results are very gratifying and positive findings are fully as frequent as with the original Wasserman test.

Dr. Henry Gradle saw a striking instance of tarsitis, which he followed to recovery, occurring in a female with a definite syphilitic history, although there were no free manifestations at the time. The tarsus was enormously swollen and because of a feeling of fluctuation that was present, an incision was made with the hope of finding fluid. None was found. Antisyphilitic treatment was ineffective until after about three months. when the disease gradually disappeared and after four or five months there was no evidence of it and the tarsus was intact. Whether recovery was due to the treatment could not be determined in this case.

As to the etiology of interstitial keratitis, Dr. Gradle is convinced that it is easy to determine whether syphilis or tuberculosis is the cause of keratitis. If the affection occurs in both eyes, either simultaneously or in close sequence, beginning as a cloudiness at the periphery, and spreading over the entire cornea, with the formation of blood vessels in the deeper strata, it is always a case of syphilis. Tuberculosis is usually monocular, and no new vessels are formed in the inflammatory tissue. Hirschberg, he said, laid stress on the fact that one can always demonstrate new vessels in a keratitis of syphilitic origin. The prognosis is in inverse proportion to vascularization. The cases showing the greatest formation of vessels in the cornea from the start are most likely to prove serious, and to leave the greatest optical disturbance. Dr. Gradle has seen only one instance of absolute recovery of perfect transparency of the cornea. The history was beyond question. Vascularity was marked The picture was not typical, but it involved both eyes and began as a peripheral cloudiness which spread over the entire cornea, clearing up in four or five months and leaving the cornea absolutely transparent The history of these cases is exceedingly prolonged. Dr. Gradle has known a few cases to pass practically through the entire period of climaxes and recovery to the limit with six or seven months. Sometimes vascularization is absent entirely, and these cases usually go on to a speedy recovery. He has known one case of almost complete blindness due to persistent opacity.

Dr. Gradle agreed with Dr. Wood as to the ineffectiveness of antisyphilitic treatment. At one time he felt that he could influence the course of the disease by administering large doses of iodine, but he now inclines to the belief that that was an error of observation, because it could not be confirmed. Stevenson gives a toxine in moderate doses, with continued mercurial medication, but the results are not convincing and many cases of damage to the optic nerve are recorded.

As regards recovery of cases of syphilitic iritis, he has never seen a case that did not recover entirely, except that synechiae are left. It occasionally affords a very interesting observation, showing that it can be prevented by specific treatment or is influenced markedly by specific treatment, to this effect that it occasionally occurs in patients who have been under moderately active treatment, and still the disease makes its appearance in one eye. If treatment is pushed and the disease occurs in the second eye, it runs a milder course, but he does not believe that it can be prevented entirely by specific treatment. He has noted that syphilitic iritis seems to be more obstinate in those cases where the cutaneous manifestation takes the form of the eruption of lichen.

Dr. Charles H. Beard confined his part of the discussion of intraocular syphilis to demonstrations of the appearance of specific chorioiditis and chorioretinitis.

Dr. George F. Suker said that a number of years ago he advocated the use of large doses of potassium iodide, even up to one thousand grains a day, but no one received the suggestion with favor; therefore, he was rather pleased at Dr. Baum's advocacy of large doses. He was also pleased to hear Dr. Wilder's classification of iritis. He has seen but few cases of multiple gummata of the iris; as a rule, they are single, and project from behind forward, crowding the iris and projecting through a rent in the iris. A papule, on the other hand, destroys the iris tissue, as a whole. As to parenchymatous keratitis, he has pursued a line of treatment similar to that outlined by Dr. Wood—hygiene, feeding and toning up the patient's general condition rather than giving antispecifics. He has had most excellent results, although the opacity does not disappear entirely. There always remains some haziness and the disease is of longer duration. One case lasted seven years but that was an exception.

With reference to the pigmentation in the iris, if one will observe the iris after an attack of syphilitic iritis which has been practically cured, he will find more absorption of the pigment than occurs in any other form of iritis, and the pigment is much finer than in any other form. This is a very characteristic sign. He agreed with Dr. Wilder that the majority of cases of syphilitic iritis are complicated by more or less involvement of the anterior portion of the chorioid. An examination of the anterior portion of the fundus will disclose evidence of such involvement. Contrary to the usual opinion, Dr. Suker does not believe in giving potassium iodide or mercury early in the attack during the acute stage. It is adding insult to injury, the tissues being already loaded down with discharge, and should not be subjected to any further glandular stimulation

Dr. O. Tydings agreed with all Dr. Baum said with regard to the treatment by large doses of mercury and iodides, but the question is: Is the lesion a specific one or not? If it is specific, antispecific treatment is indicated, but it must be remembered that some of these cases will get well after years of treatment. He recently dismissed a case of interstitial keratitis in a young man, twenty-four years of age, who had been under treatment for seven years. The Wasserman test and finding the spirochaete are great aids in diagnosis.

As to the matter of inheritance, the question arises whether it comes from the male or from the female. The female may pass through life without any external evidence of specific disease, and yet the offspring is syphilitic. If the disease is propagated by the male, how is it propagated? Is the spermatozoon capable of carrying the spirochaete?

Dr. F. G. Harris said that the probabilities are that the mother is infected with syphilis and herself infects the ovule, which has been shown to contain the spirochaete. Even such a woman presents no external evidence of syphilis, the Wasserman test is positive, and her offspring is syphilitic. Why the mother is free from symptoms and signs has not been explained. A typhoid may recover from the disease and carry organisms around in the body for the remainder of his life without showing any pathologic change. The same thing may be true of the mother infected with syphilis.

As to potassium iodide, it has been shown that the potassium iodide treatment in syphilis is purely symptomatic and that the more modern treatment is etiologic. The iritis is due to the spirochaete. It has been found in the lesions of the eye, heart, cerebrum and elsewhere, showing that it is the etiologic cause of syphilis. It is true that the iodide will remove the products of inflammation, but it does not cure the syphilis; therefore, a recurring iritis means that the disease is still active. Mercury and arsenic are the only drugs that annihilate the spirochaete; therefore, mercury is indicated whenever a diagnosis of syphilis is made, no matter in what stage. Mercury cures the disease.

Dr. L. Wallace Dean said that for three years he has not been giving any systematic treatment for the hereditary forms of interstitial keratitis, but in the acquired syphilis he has not been able to get any results except by pushing systematic treatment.

Dr. Julius Grinker said that it was found many years ago that in the tertiary lesions of the brain, iodides very often failed unless vigorous mercurial treatment was instituted. That knowledge was empirical, but now we know that such treatment really was good scientific practice, using mercury for the advanced lesions and the early ones, and later on using the iodides. In the secondary stage of syphilis mercury is indicated, but the tertiary lesions must be treated by iodides.

Dr. B. C. Corbus believes that there is no test superior to the Wasserman test, although, as in the case of every new discovery, imitations soon appear. The Wasserman test is positive for syphilis, but also gives a reaction in frambesia, yaws and even in scarlet fever. We now use an alcoholic extract, and one syphilitic liver will produce about a quart of antigen, and remain stable for two or three years. Dr. Corbus has also used the guinea-pig heart with fair success. In one case of supposed congenital syphilis of the eye the test was made with the heart antigen from the guinea-pig and with liver antigen. The former gave a negative result, while the latter gave a positive result. It was concluded that the syphilitic antibody was so fine that the heart antigen could not detect it, whereas the liver antigen, being more powerful, gave a positive reaction.

Dr. Casey A. Wood said that he spoke more particularly of the anti-syphilitic treatment of interstitial keratitis, and that he is very much in favor of the general anti-syphilitic treatment in the great majority of other syphilitic diseases of the eye. He asked Dr. Baum as to the value of intravenous injections of mercurials and whether the course pursued by Darier and others who used limited amounts of antitoxin is entirely safe. Darier believes that one-half the ordinary dosage of atoxyl given for a great length of time is safe, so far as the eye is concerned, and that all cases of disturbance have occurred with a larger dose.

Dr. Wilder said that his experience is in accord with the experience of others in regard to the graver prognostic import of syphilitic iritis, as compared with the simple forms of iritis, but that does not mean that many of the cases of syphilitic iritis do not recover fully.

As to the large doses of iodide of potassium, he believes in their efficacy, particularly when nervous structures are involved. There is no dosage of potassium iodide; it depends on circumstances. He has seen nuclear palsies of the eye disappear, but not until after he had reached heroic doses. One case of palsy of the external rectus did not yield to treatment until the patient was taking 600 grains of potassium iodide three times a day.

As to the quality of potassium iodide used, he wanted Dr. Baum to say whether certain makes of potassium iodide are better than others. He has been informed that Merck markets four grades of potassium iodide, running in value up to the highest purity. In sensitive persons there is always some gastric disturbance in spite of the fact that iodide is given with certain pepsin preparations, but since using the Merck iodide of highest purity, he has not noted this disturbance.

Dr. William L. Baum answered Dr. Wood's question by stating that small doses of atoxyl have not given better results than moderate doses of mercury. Intravenous injections of mercury were popular years ago, but are no longer considered good practice. The results are not strikingly better than from hypodermic medication, and the danger of clot formation, which he does not believe to be very great, might become so in the hands of those who are not skilled in the technic of the injection.

As regards the different grades of potassium iodide, he said that there has crept into use, for financial reasons, the employment of iodides which are not strictly pure, therefore, it was found necessary to market iodides of various grades. He advised using the best grade always and some manufacturers make better iodides than others, but owing to the fact that the profession has been discouraged from specifying certain mixed preparations, he hesitated to speak about this point. He also advised giving pepsin preparations and called particular attention to the necessity of proper dilution, because saturated solution of potassium iodide produced congestion of mucous membranes. Therefore, large doses well diluted can be used with safety. That is also the reason for giving iodides after meals or when food is present in the stomach. In case of intestinal congestion, it is advisable to give lactopeptin instead of pepsin. One point we must not lose sight of is the fact that syphilis must be treated by mercury for a minimum period of three years, and for every year of the patient's life thereafter. He is convinced that the time will come that the Wasserman test or some modification of it may be employed by every physician, and we can then say when the time has arrived that the patient is no longer in need of anti-specific treatment. When the test is positive, treatment must again be instituted. That will also determine the amount and specific treatment necessary. There is another reason for lengthening the duration of treatment, and that is that every syphilitic has a tendency toward hardening of the vessels, and increasing the blood pressure. It is in these cases particularly that iodides are indicated, because they remove from the vessels certain elements which decrease their elasticity, and to a certain extent lower the blood pressure. He is firmly convinced that we add to the expectation of life of the syphilitic at least a period of from five to ten years, by pursuing such a course, but he must receive some sort of treatment as long as he lives.

WILLIS O. NANCE,
Secretary.

OPHTHALMIC SECTION.

ST. LOUIS MEDICAL SOCIETY.

Meeting, Wednesday, January 13, 1909. Chairman, Dr. A. E. Ewing, presiding.

Parinaud's Conjunctivitis.

(Dr. Carl Barck. Presentation of Case.)

The patient, a boy of 12 years, consulted Dr. Barck December 21, 1908, saying that one year previous he had had some soreness and discharge from the left eye, with swelling of the upper lid and some swelling in front of the left ear.

When first seen by Dr. Barck there was a muco-purulent discharge, conjunctiva of lower lid slightly injected, conjunctiva of upper enormously swollen and infiltrated, particularly the fold of transmission. There was a large excrescence in the center of the conjunctiva of the upper lid, the size of a small pea with a yellowish white ulcer in the center. On the nasal half of the same conjunctiva were three yellowish gray infiltrates of pin-head size with two spots on the temporal half. The pre-auricular gland was enlarged being one-half inch in diameter. The two cervical glands, also enlarged, were smaller. Inquiry was made as to the association of the boy with animals, because of the belief that this disease is transmitted from domestic animals, especially cattle. The patient had been in contact with no animals except a goat which had no abnormal condition of the eyes. Under general anesthesia, one of the infiltrated follicles was removed and examined, and the excrescences and all infiltrations were expressed with Noyes' forceps. The specific organism of the disease which is supposed to exist has so far not been classified. In this case, the follicle excised was subjected to microscopical examination, and a number of smears made and examined, all with negative results. Four eyes and one cornea of rabbits were also inoculated, with negative results.

A Case of Suppression of the Secretion of the Aqueous Humor.

(Dr. W. A. Shoemaker.)

J. M. C., aged 42, consulted me on December 14, 1908, giving the following history:

Was chopping wood one week ago, when a piece struck him in the right eye, slightly wounding the edge of the lower lid and at once completely blinding him. He is positive that he could not distinguish light from darkness with this eye for several hours, after which time vision began to return, and by evening, the accident having occurred in the morning, he could distinguish large objects. His vision remained blurred and two days after the accident, he applied at one of the clinics for treatment. He took treatment for the succeeding five days, and finding his vision no better, consulted me on the morning of December 14, when I found the eye in the following condition:

V. = 5/200. Ciliary and conjunctival injection, some photophobia, lacrimation and pain. Pupil about 4 mm. in diameter, anterior chamber extremely shallow and the tension about —2. As the iris was inflamed, atropin was used to dilate the pupil. Some posterior synechiae were found which disappeared by the next day. The ophthalmoscope revealed deposits on Descemet's membrane, and a hazy vitreous. Bichloride of mercury in 1/16 gr. doses was given internally three times daily. The next day, December 15, the pupil was dilated ad maximum; there was less ciliary injection, no pain, and the vision was 13/200. Tension about —2. On December 16, V = 13/70. December 26, ciliary and conjunctival injection gone, vitreous much less hazy, and vision 13/50; W. —.50 D. S. = —.50 D. C. Ax. 75 = 17/20. January 5, 1909, V. = 13/20. Vitreous clear. Anterior chamber shallow, as at first. T. —1. January 13, eye quiet, V. = 13/30. W. —.50 D. S. = 17/15. Reads J. 1 at 14″ W. + 1.50 D. S. T. —1, Anterior chamber shallow as at first visit. V. O. S. = 17/15 W. + 10 S. = 17/15: J. 1 at 13″. The temporary complete loss of vision in this case was probably due to commotio retinae, which was caused, as it usually is, by the eye being struck with a blunt object. The shallow anterior chamber accompanied by minus tension can, it seems to me, be accounted for only on the supposition that there is a suppression of the secretion of the aqueous humor. This is a condition that, so far as I know, is quite rare.

A cursory examination of the available literature reveals only one case, which was reported by D. C. Lloyd-Owen in the *Ophthalmoscope,* August 1, 1906. A professional man, aged 40, who had always enjoyed good health and good vision, complained of having blurred vision in his right eye, with a slight soreness, for one week. Owen found the anterior chamber very shallow, pupil active and normal in size, some tenderness over the equatorial region, and tension —2.

This condition lasted for one month, when his sight suddenly became normal for a few hours. One week later his vision again became normal, at which time the author found the anterior chamber and the tension normal. Four days later he had another relapse of three days, after which the eye remained normal for fourteen days, followed by a relapse of three days, a recovery for a month, two days relapse and then permanent recovery.

Retinal Degeneration Simulating Retinitis Circinata.

(Dr. John Green, Jr.)

Mrs. M. G., married, age 65 years, Russian, came to my service at the Protestant Hospital Dispensary December 26, 1908. She stated that the vision of left eye had been defective for some time. On December 25, the vision of the right eye suddenly grew dim. R. E. with plus 1 sph. V. 20/100, L. E. with plus 1 sph. V. 20/50. The ophthalmoscope revealed in the right eye retinal degeneration and hemorrhages. The patient was put in the hospital and a careful physical examination by Dr. M. L. Warfield revealed nothing in the general symptoms to account for the retinal degeneration. Urinalysis showed absence of albumen, sugar, blood and bile. No increase in indican. Microscopically, epithelium and pus cells, no casts. Under potassium iodide, the hemorrhages have partially resorbed, but otherwise the fundus picture is much the same as at first examination. I present the case mainly to elicit suggestions as to how it should be classified. Its general appearance is suggestive of retinitis circinata.

Discussion: Dr. F. L. Henderson said that Dr. Green had referred to the possibility of his case being retinitis circinata. Dr. Henderson had had the pleasure of seeing two cases of retinitis circinata in the last two years. When he saw the first one he had looked up the picture of the disease as presented in de Schweinitz's report and found it almost identical with the picture of the case he had in hand. He thought that Dr. Green's case showed very little resemblance to retinitis circinata. The arrangement of the white deposits was not sufficiently circular to give it that name. As he understood retinitis circinata, it was a name for a form of retinitis distinguished by its peculiar anatomical arrangement. These exudates, or whatever the peculiar white tissue is, are arranged in circular form and unless so arranged, he did not believe it should be called a retinitis circinata.

Removal of Fragment of Steel Imbedded in the Crystalline Lens, Followed by Linear Extraction.

(Dr. W. H. Luedde.)

J. C., age 40 years, formerly base ball player, now carpenter, presented himself at the O'Fallon Dispensary December 23, 1908, for treatment for his left eye. His statement was that four days before, while trying to loosen a steel chisel, which he struck on the sharp end with a hammer, a small piece broke off and lodged in his left eye.

When I first saw him, the lens of the left eye was found clouded, a faint red reflex being present at the periphery, photophobia and circumcorneal injection were marked, pupil small and iris adherent to the anterior capsule of the swollen lens. Further examination showed what appeared to be the scar of a perforating wound in the center of the cornea. Immediately behind this, lying with its point forward, in the antero-posterior axis of the lens, was a small sliver of metallic substance, probably steel. The removal of this was accomplished by the aid of Dr. Charles with his giant magnet. Eleven days later, a linear extraction was done to remove the swollen substance, which was causing pronounced secondary glaucoma.

There have been no unpleasant complications and the vision now is fingers at two feet, which will no doubt improve as the soft lens substance which still is present in the pupil will be absorbed.

Discussion: Dr. J. E. Jennings had had a case which might be of interest. A young man, about 20 years old, had had a hammer and a hatchet in his hand tapping them together. While doing that, something struck him in the right eye. He went to a drug store and was given a lotion, which he applied to the eye. His eye cleared up and did not hurt him at all. He only consulted Dr. Jennings on account of the dimness of vision in that eye. Examination showed opacity in the upper part of the lens; the iris seemed to be attached at that point, and there was visible a very small wound in the cornea. The localized opacity in the lens seemed to point to the presence of a foreign body, so the giant magnet was used. As soon as the current was turned on, the lens was drawn forward. The doctor thought he could detect the end of a piece of steel. He made a small incision and, introducing an iris forceps, picked it out.

The Technique of Localizing Foreign Bodies in the Eye and Orbit by the X-Ray.

(Dr. R. D. Carman.)

Dr. Carman, in localizing foreign bodies in the eye and orbit, uses the method of Dr. Sweet of Philadelphia as modified by Dr. Bowen of Columbus in conjunction with the Weeks-Dixon Chart. The localizing instrument, together with localizing stand and clamp for the head, tunnel and plate carrier, are made by Kelly-Koett Manufacturing Company. The tunnel and plate carrier of this instrument enables one to make two exposures on one plate without disturbing the patient or the localizing instrument. Two pictures are taken in slightly different planes and from the shadows of the ball and cone, used as indicators, whose positions are known, measurements to the foreign bodies are made and recorded upon a chart by which the position of the latter is graphically shown at once, without any intricate mathematical calculation. The technique of the operation is as follows:

The patient is required to lie upon the regular compression diaphragm table, the head resting on the localizing stand with the affected eye next to the plate, clamped and steadied with sand bags to prevent motion. The visual axis of the eye should be parallel to the plane of the plate and fixed on some object. For this purpose a candle is employed at a distance of 15 feet and an inch or two above the level of the localizing stand. By this means the visual axes are rendered approximately parallel to the plate. With the patient in position, and the eyes fixed, the indicators are adjusted. The indicator is set and the ball placed in the center of the cornea so as to indicate the visual axis of the eyeball. The patient is then asked to close the eyes and the ball pushed into the lid about the lid's thickness and the trigger released, when the ball drops back 10 mm. The patient is then instructed to open the eyes again and look steadily at the candle.. In this position the first exposure is made with the ray perpendicular to the plate and parallel to the indicators. The tube is then shifted toward the patient's feet four or five inches and tilted slightly. The plate is changed and without moving the ball and cone another exposure is made. Measurements are made as follows:

Upon the first negative a line is drawn in the axis of the rod and ball which are here superposed, and the visual axis of the eye is at once established. A line is also drawn perpendicular to this and through the center of the foreign body's shadow. With a millimeter rule is measured the distance of the foreign body above or below the visual axis and said distance in millimeters laid off upon the front view in the chart either above or below the center of the cornea, and above or below the point representing the position of the cone. A line is drawn through these indicated points on the chart.

Likewise upon the second negative, lines are drawn through the axis of the ball and the axis of the cone and one perpendicular to these through the foreign body. Then with the millimeter rule the distance of the foreign body above or below the prolonged axis is measured. These distances are also recorded upon the front view in the chart at the proper point and a line is drawn through these points. The intersection of this line with that made from the first negative will represent the location of the foreign body as viewed from the front.

Again upon the first negative the distance of the foreign body from the anterior surface of the cornea is determined by measuring from the ball along its axis to the perpendicular through the foreign body and deducting 10 mm. for the rebound of the ball when the trigger is released. Upon the chart, a line is drawn from the point of intersection in the front view, parallel to the line going through the center of the cornea, into the horizontal section, and the distance from the front of the cornea measured and indicated. In a like manner, a line is drawn from the point of intersection in the front view, parallel to the chart line going through the center of the cornea, into the side view, and the distance measured back from the center of the cornea.

In making the lines, the measurements upon the negative charts, extreme accuracy should be sought for, since an error of only a millimeter in measurement may lead to a more considerable error in fixing the location of the foreign body.

L. P. Williamson, Section Editor.

BOOK REVIEW.

The Ophthalmic Year Book, Volume VI.

By Edward Jackson, A. M., M. D., George E. de Schweinitz, A. M., M. D., and Theodore B. Schneideman, A. M., M. D., The Herrick Book and Stationery Company, Denver, Colorado.

The sixth volume of the Ophthalmic Year Book under the well-known and experienced editorship of Drs. Jackson, de Schweinitz and Schneideman, completes for another year a systematic review of all contributions to Ophthalmology worthy of record, which have been made during this time.

As we have said in reviewing previous volumes of this work, the Ophthalmic Year Book has become a necessity to him who will keep in touch with the recent literature pertaining to ophthalmology. Without it, like results for the modern ophthalmologist, could only be accomplished by an immense amount of labor and research.

The present volume is better in many ways than the preceding volumes and, barring a few mistakes, which must always occur in a work of this kind, is a thoroughly reliable guide and resume of a year's progress.

William T. Shoemaker.

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